



# Atlantic County Coastal Region Regional Resilience and Adaptation Action Plan (RRAAP)

October 2022



Atlantic County, Atlantic City,  
Brigantine, Pleasantville, Northfield,  
Ventnor City, Margate City, Longport,  
and the American Red Cross

Submitted by:





Nick Angarone, New Jersey Chief Climate Resilience Officer  
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Bureau of Climate Resilience Planning  
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Dear Mr. Angarone:

The Resilient New Jersey – Atlantic County Coastal Region (ACCR) Steering Committee and Consultant Team are pleased to submit this Regional Resilience and Adaptation Action Plan to the New Jersey Department of Environmental Protection (NJDEP) Bureau of Climate Resilience Planning.

The ACCR—comprising Atlantic City, Brigantine, Longport, Margate, Northfield, Pleasantville, Ventnor, Atlantic County, and the American Red Cross—is a unique asset not only to New Jersey, but nationwide and beyond. And this RRAAP—which is the result of several years of program planning by NJDEP and almost two years of regional planning by the Steering Committee; stakeholder organizations; and residents, workers, and visitors—identifies actions that will better prepare for current and future flood events and chart a regionally collaborative pathway to more resilient future. It comprises the:

- planning context in which the RRAAP will be implemented;
- robust engagement process undertaken to develop, and collect feedback on, a regional vision and plan;
- risk and vulnerability assessment documenting the important assets and presenting both quantified and qualitative assessment of risk to those assets;
- planning scenarios and supporting actions developed to achieve the regional vision; and
- final Preferred Scenario of the RRAAP and next steps for implementation.

Preferred Scenario actions are categorized to address the variety of challenges and opportunities for a more resilient ACCR: Shoreline Protection, Power and Communication, Access and Transportation, Stormwater Management, Equitable Economic Development, and Vulnerable Populations and Public Facilities. The Steering Committee selected these actions because they address specific flood vulnerabilities and advance the shared vision of the region's water-oriented economy and culture.

Through the Resilient NJ Program, the ACCR is in the process of implementing specific near-term actions selected by the Steering Committee to enhance short-term resilience as well as set the region up for long-term success, making it attractive to future funding opportunities through federal government, state government, and non-governmental organizations.

We look forward to continuing to collaborate with NJDEP to advance the resilience of ACCR and New Jersey as a whole.

Sincerely,

A handwritten signature in black ink, reading "Amy DiCarlantonio".

Amy DiCarlantonio, WSP Project Manager

A handwritten signature in black ink, reading "Jim Rutala".

Jim Rutala, ACCR Regional Coordinator,  
on behalf of the Steering Committee



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This information is available in the following languages upon request:

Español 中文:繁體版 Việt-ngữ 한국어 Tagalog Português العربية Kreyòl ភាសាខ្មែរ Italiano Polski

[www.renewjerseystronger.org](http://www.renewjerseystronger.org)

Language translation assistance for limited or non-English speakers is available. If you need language translation services, please email [Sylvia.Johnston@dca.nj.gov](mailto:Sylvia.Johnston@dca.nj.gov) with your translation needs.

## ACRONYMS AND ABBREVIATIONS

ACCR	Atlantic County Coastal Region
ACE	Atlantic City Electric
ACEA	Atlantic County Economic Alliance
ACMUA	Atlantic City Municipal Utilities Authority
ACUA	Atlantic County Utilities Authority
ATIA	America’s Transportation Infrastructure Act
BRIC	Building Resilient Infrastructure and Communities
CAC	Community Advisory Committee
CRDA	New Jersey Casino Reinvestment Development Authority
Draft Integrated Report	New Jersey Back Bays Coastal Storm Risk Management Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
HMGP	Hazard Mitigation Grant Program
LEP	Limited English Proficiency
MHHW	Mean Higher High Water
NAVD 88	North American Vertical Datum of 1988
NFWF	National Fish and Wildlife Foundation
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NOAA	National Oceanic and Atmospheric Administration
SEOP	Standard Equity Operating Procedures
SF	square feet
SJEDD	South Jersey Economic Development District
SLR	sea level rise
SVP	socially vulnerable populations
TAC	Technical Advisory Committee
USACE	United States Army Corps of Engineers
WHC	Wildlife Habitat Council

# 1 OVERVIEW

## 1.1 Regional Background

The Atlantic County Coastal Region (ACCR) comprises the municipalities of Atlantic City, Brigantine, Longport, Margate, Northfield, Pleasantville, and Ventnor, as well as Atlantic County. The American Red Cross of New Jersey is also part of the regional team as the local community-based organization partner. The Planning Context document, prepared in November 2021, provides a baseline repository of information on the ACCR's history, challenges, and initiatives along with a snapshot of social, public policy, and economic conditions. The ACCR is a diverse region socially and economically. Municipalities range from large economic centers to residential towns with large seasonal populations, and the population represents a wide variety of economic and ethnic backgrounds.

### Population

The ACCR is densely populated, consisting of approximately 92,000 people living across 30 square miles. The region includes two barrier islands, Brigantine and Absecon Island (comprising Atlantic City, Ventnor, Margate, and Longport), separated from the mainland by a series of bays (referred to in this report as the Back Bay), as well as the communities of Northfield and Pleasantville located on the mainland. The ACCR is demographically diverse, with a wide range of ages and ethnicities calling it home. Much of the ethnic diversity is concentrated in Atlantic City and Pleasantville, where a substantial percentage of the residents are minority or low-income. While the populations of specific demographics groups are increasing, the overall ACCR has lost population over the past 10 years. See **Figure 1-1**. Out-migration to other parts of South Jersey and the rest of the country has not been balanced by in-migration or natural births. In turn, the average age across the ACCR has been rising, and school enrollment rates have trended downward.

### Social and Economic Drivers

The ACCR's gradual decrease in population has been paired with an economic contraction since approximately 2005. For decades, Atlantic City has been a resort destination, and the gaming and casino industry has been the center of economic activity since casinos were legalized in the city in 1976. With expanded legalization of casinos and gambling elsewhere in the Northeast United States, the advent of online-gambling, and other macroeconomic changes and shocks that hit Atlantic City, the ACCR experienced an economic downturn that affected thousands of jobs within and outside the region. See **Figure 1-2**. These challenges were exacerbated by the COVID-19 pandemic in 2020 through 2021. The downturn has somewhat stratified the local economies within the ACCR, as beach communities like Ventnor, Margate, Longport, and Brigantine increasingly become vacation-home destinations with seasonal populations instead of bedroom communities for Atlantic City.

Figure 1-1. Population Shifts in the ACCR, 2010-2019

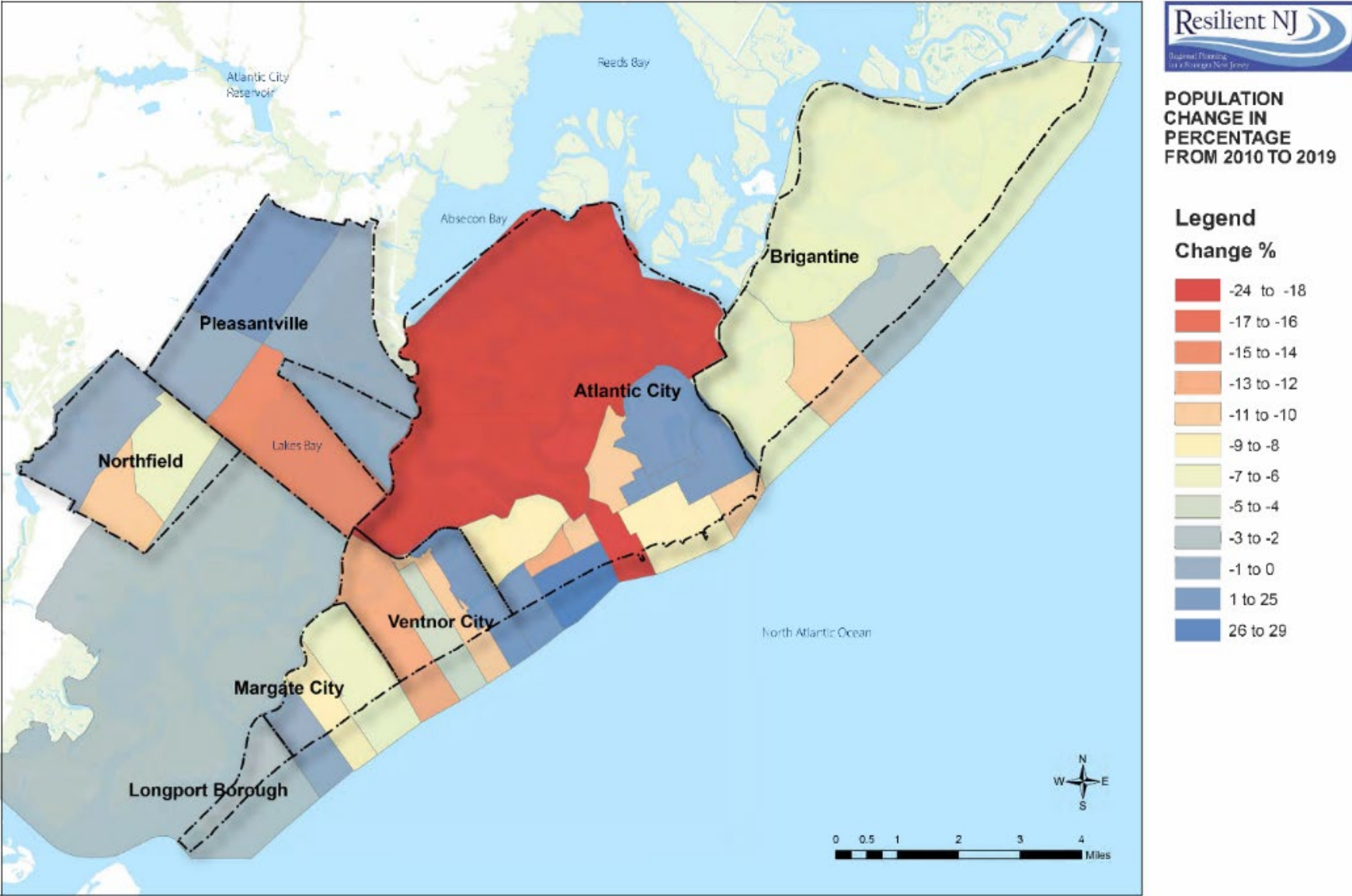
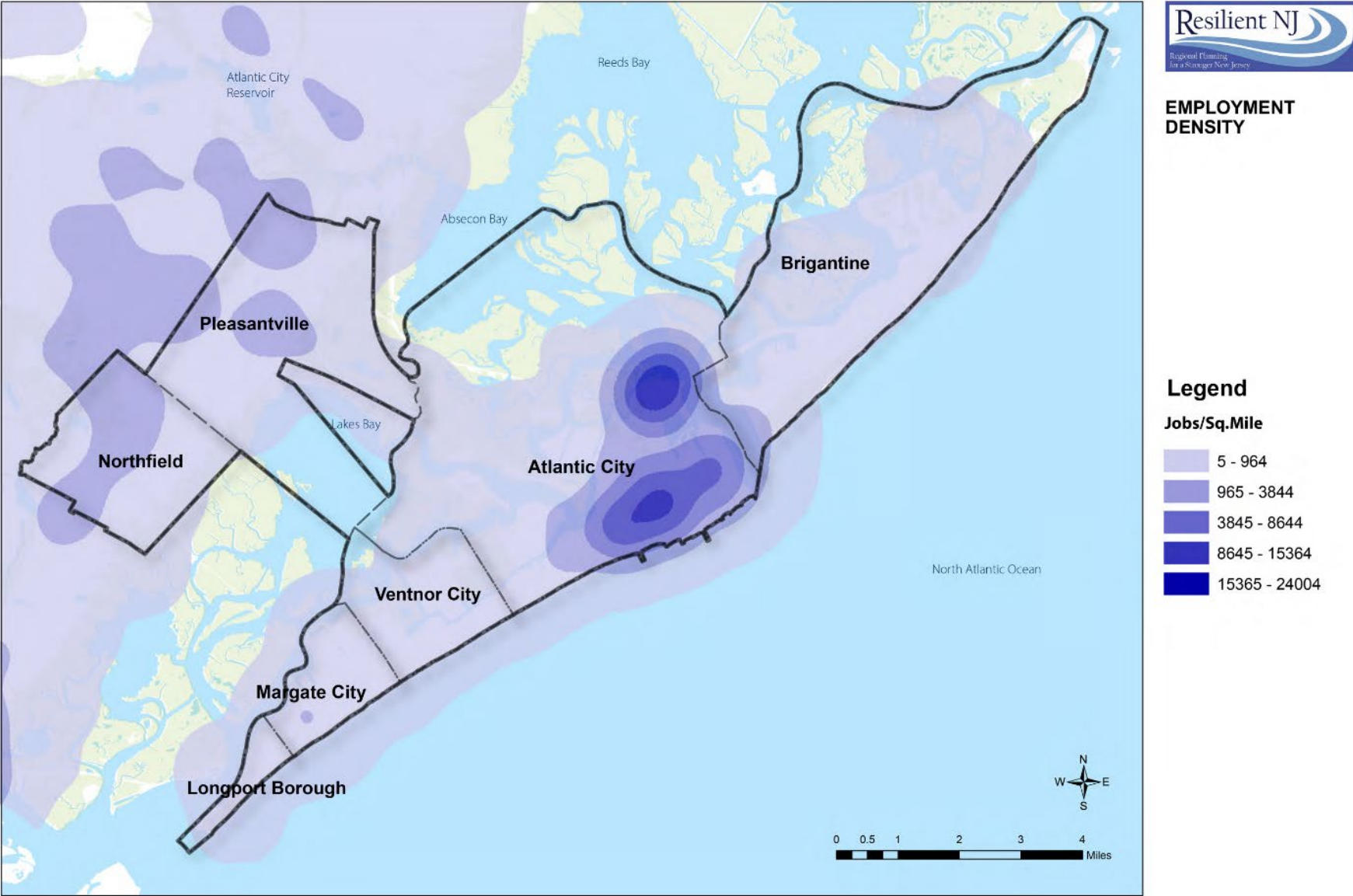


Figure 1-2. Employment Density within the ACCR, Pre-Covid-19





Even with this period of stagnation, the region is still the hub for economic activity in Atlantic County and is one of the largest hubs in South Jersey. Prior to COVID-19, the area was home to more than 80,000 jobs, with casinos accounting for roughly 25,000 of these jobs. Many aspects of the local economy are driven by tourism; the region can experience upward of 150,000 visitors during peak summer weekends. This demand generates seasonal jobs for residents of the ACCR and surrounding communities.

During both peak and off-peak seasons, access and mobility is a fundamental component of the regional economy. Limited connections for vehicular, boat, and train traffic are essential to reach destinations along the beaches and bays, particularly on Absecon and Brigantine Islands. Approximately 62 percent of residents lived within 10 miles of their place of employment, and bidirectional access between the ACCR and surrounding communities in South Jersey and the Philadelphia region for goods, services, and leisure is of critical importance to the region.

### **Cultural Values and What Resilience Means Today**

Throughout the Resilient New Jersey engagement process, each community stressed its desire to preserve the region’s unique, shore-based economy and culture. Stakeholders emphasized both the protection of their present way of life from physical threats and the need to develop opportunities that can expand economic dynamism in the region, particularly after close to 20 years of relatively stagnant regional economic conditions.

Steering Committee members, who represent stakeholders in their region, set a range of priorities to address regional challenges, as opposed to more parochial local concerns. This focus may help ease some of the social and economic stratification among communities that has occurred in recent years.

Communities know there are no “silver bullets” to achieve a wholly resilient future. Individual actions that promote resilience should start small to enhance regional capacity and coordination, and then more ambitious and complex actions can be taken. Approaches to address resilience challenges should leverage existing community linkages and inter-relationships (such as mobility and utilities). Actions should prioritize the needs and desires of existing residents and connect to the assets and resources currently in the community. See **Table 1-1**, which summarizes the ACCR priorities and areas of interest.

**Table 1-1. ACCR Priorities and Areas of Interest**

<b>Member</b>	<b>Priority/Interest Areas</b>
American Red Cross	<ul style="list-style-type: none"> <li>❖ Expand and incorporate preparedness in communities.</li> <li>❖ American Red Cross can offer community tools to strengthen resilience through education, free resources, and training programs, including preparedness programs, youth-based programs, and business continuity programming.</li> <li>❖ American Red Cross seeks to pilot and establish a community preparedness foundation.</li> </ul>

Member	Priority/Interest Areas
Atlantic County	<ul style="list-style-type: none"> <li>❖ The Action Plan must be realistic; funding is key. Many projects and programs are proposed that never happen because funding is not available.</li> <li>❖ Atlantic County is a large source of revenue and should be considered when planning to help integrate plans across jurisdictions and stakeholders.</li> <li>❖ It is important to nurture businesses and consider economic sustainability.</li> </ul>
Atlantic City	<ul style="list-style-type: none"> <li>❖ Communities have many common challenges and assets.</li> <li>❖ Atlantic City has a diverse population with a high renter population.</li> <li>❖ Atlantic City and the ACCR face equity issues and challenges.</li> <li>❖ Atlantic City Boardwalk is one of the ACCR's assets; the boardwalk has received funding in the past and has made some improvements but has a long way to go.</li> <li>❖ The Blue Economy is a part of larger economic diversification and development plan to serve growth and sustainability goals. The City is continuing to explore installation of one or more microgrids.</li> <li>❖ Community involvement and outreach are important to Atlantic City.</li> <li>❖ Atlantic County's point of view and ongoing coordination with the county are also important to Atlantic City.</li> </ul>
Brigantine and Ventnor (jointly represented by one Steering Committee member)	<ul style="list-style-type: none"> <li>❖ Infrastructure, both local and regional, is important to Brigantine and Ventnor.</li> <li>❖ Shared resources and services (e.g., equipment, contracts) are necessary for increasing resilience and improving efficiency, cost and otherwise.</li> <li>❖ The two communities are looking forward to prioritizing actions and projects that bring resilience in both local and regional ways.</li> </ul>
Longport	<ul style="list-style-type: none"> <li>❖ Primary areas of focus include preparedness, regional approach, shared services, consistency of communication.</li> <li>❖ Regionalization is key to getting the Action Plan to work; a regional approach may offer the ability to secure more funding if communities are working together.</li> </ul>
Margate	<ul style="list-style-type: none"> <li>❖ Opportunities for shared services and program like disaster debris management would be helpful for building resilience.</li> <li>❖ The Action Plan must be simple and allow actions to be attainable for communities to work together routinely.</li> <li>❖ Margate, Longport, Ventnor, and Atlantic City all have something to gain by improving shared infrastructure.</li> <li>❖ Reinforce Shelter Island to absorb storm surge/effects on bayside communities.</li> </ul>

Member	Priority/Interest Areas
Northfield	<ul style="list-style-type: none"> <li>❖ Important to start small and then grow the Action Plan, working together with other municipalities.</li> <li>❖ Shared services and interdependencies can increase resilience—the towns depend on each other for evacuation access.</li> <li>❖ Primary focus is on emergency response and emergency management.</li> <li>❖ During an emergency, there should be a regional approach to avoid duplicative processes, costs, and overlapping services.</li> </ul>
Pleasantville	<ul style="list-style-type: none"> <li>❖ The Action Plan should be on target with the city's goals.</li> <li>❖ Many residents work in surrounding cities; it is important to consider economic actions for how the region functions as a whole.</li> <li>❖ Pleasantville is unique in its diversity; there has been a huge shift in the last ten years with the growth of a large population of non-English speaking residents and English as a second language residents.</li> <li>❖ It is important to make sure residents have resources; undocumented immigrants, who might be residents and are afraid to reach out because of the resident status, must also be included.</li> <li>❖ Pleasantville has redevelopment plans that are in progress that would be beneficial for the Resilient NJ planning process to incorporate.</li> </ul>
Regional Coordinator	<ul style="list-style-type: none"> <li>❖ The coastal area is an economic engine within county, state, and broader region that needs to be protected.</li> <li>❖ The Action Plan must include structural, nature-based policy, and economic development strategies that are positioned for state and federal funding.</li> <li>❖ The U.S. Army Corps of Engineers Back Bays Study was refunded; the Federal Emergency Management Agency [FEMA] has more money than it has in the past; the key is to get Atlantic County their fair share.</li> <li>❖ Must coordinate with policymakers to ensure regulations align with local realities and needs and generate new opportunities for innovation.</li> <li>❖ Energy, fishing, and beach/bay recreation and tourism help form the basis of the Blue Economy, which could generate significant growth in jobs, training programs, and research and development.</li> </ul>

Source: Interviews, Resilient NJ Steering Committee Meetings, January–June 2021.

### Major Themes of the Planning Context

The Planning Context revealed that while the ACCR is somewhat stratified in terms of socioeconomic conditions, the communities share a number of challenges and opportunities that form a cohesive region with a shared identity.

*Table 1-2. Planning Context Themes*

1. The relationship to both the ocean and bay is clearly an asset to all residents and visitors, though this geographic proximity is also what creates resilience challenges.
2. The regional stakeholders see efficiencies and benefits from more intermunicipal cooperation. Present examples of where this cooperation has happened, such as in storm cleanup, have been successful.
3. Coastal resilience is a stated goal for each and every community; municipal master plans, resilience-specific policy strategies, and prior investments in resilient infrastructure have been implemented in each member municipality. There is clear institutional knowledge and buy-in from community leaders to enact a realistic regional Action Plan.
4. ACCR member priorities relate to a shared vision of the region in which benefits from a regional Action Plan will benefit all stakeholders in the ACCR.



Image: Atlantic City's world-famous Boardwalk dates to 1870 and remains one of the top destinations. Photo Courtesy: Do Atlantic City/City of Atlantic City

## 1.2 Documentation of Regional Team Participants

A Steering Committee, comprising representatives from the communities of Atlantic City, Brigantine, Longport, Margate, Northfield, Pleasantville, and Ventnor, along with Atlantic County and the American Red Cross, has been leading the development of the Action Plan. In addition to these Steering Committee members, many local, regional, state, and federal partners provided input into the development of this plan, including:

### ❖ Federal, State, and Local Offices

- United States Army Corps of Engineers (USACE)
- New Jersey Department of Environmental Protection (NJDEP)
- New Jersey Casino Reinvestment Development Authority (CRDA)
- South Jersey Economic Development District (SJEDD)
- Atlantic County Economic Alliance (ACEA)
- Atlantic City Special Projects Office

### ❖ Institutions of Higher Education

- Rutgers University, Department of Marine & Coastal Sciences
- Stevens University of Technology, Davidson Laboratory
- Monmouth University, Urban Coast Institute

### ❖ Non-Profit and For-Profit Partners

- NJ Sea Grant Consortium
- NJ League of Conservation Voters
- The Jersey Shore Partnership

- Build Strong Coalition
- Jacques Cousteau National Estuarine Research Reserve
- Mott MacDonald Engineering
- Ørsted Wind
- Atlantic Shore Offshore Wind LLC – EDF Renewables North America / Shell New Energies
- DCO Energy

❖ Atlantic County Municipal Emergency Management Coordinators

- |                          |                      |
|--------------------------|----------------------|
| • Absecon                | • Hamilton Township  |
| • Atlantic City (Deputy) | • Hammonton (Deputy) |
| • Bueno Borough          | • Linwood (Deputy)   |
| • Bueno Vista Township   | • Margate            |
| • Corbin City            | • Pleasantville      |
| • Egg Harbor City        | • Somers Point       |
| • Egg Harbor Township    | • Ventnor            |
| • Folsom Borough         | • Weymouth Township  |
| • Galloway Township      |                      |

❖ Environmental Organizations:

- |  |                              |
|--|------------------------------|
| • Sustainable Margate                    | • Somers Point Green Team    |
| • Atlantic City Green Team               | • Egg Harbor City Green Team |
| • Great Egg Harbor Watershed Association | • NJ Future                  |
| • Brigantine Green Team                  | • Pleasantville Green Team   |
| • Linwood Green Team                     | • Sustainable Jersey         |

See **Appendix A, Planning Context Report**, for additional background on the ACCR region.

### 1.3 Engagement Strategies

In accordance with guidance established for the Resilient NJ Program, consistent and extensive community engagement was critical to the development of the Action Plan. At the start of the project, an engagement strategy was developed to guide key decisions of the project and to develop and enhance collaboration and relationships that would extend long after the actions included in the plan are implemented and continue in the response to future disasters. This strategy was laid out in an engagement plan that outlines the identification, roles, and responsibilities of project participants and stakeholders; the goals of community engagement; methods for public outreach and engagement; potential approaches for incorporating stakeholder and public feedback into the plan; and a response to the complications imposed by the COVID-19 pandemic.

The engagement plan identified the need for a Steering Committee, comprising one decision maker from each of the seven municipalities in the ACCR, as well as one decision maker from Atlantic County, the American Red Cross, and an individual regional coordinator. The Steering Committee is responsible for making final decisions about the Action Plan’s development (using the feedback from all other stakeholders).



A Technical Advisory Committee (TAC) was created as part of the engagement strategy, whose members include leaders in these communities with expertise on coastal resilience, disaster response and recovery, economic recovery, transportation, utilities, tourism, coastal engineering, and funding agencies. The TAC serves as a resource to review and provide technical feedback on deliverables.

A Community Advisory Committee (CAC), comprising a diverse set of community representatives from each of the seven municipalities, Atlantic County, and community-based organizations that represent socially vulnerable populations, was also established as part of the engagement strategy. Several nearby coastal communities that were not part of the original grant application are included on the CAC—Egg Harbor Township, Somers Point, Absecon, and Linwood. CAC members have local knowledge regarding the various elements that have affected these communities after natural disasters, such as emergency response, flooding, crime, job loss, road closures, power shortages, loss of business activity, and infrastructure challenges. Their responsibility is to provide local perspective and guidance, potential community challenges to planned scenarios, and advice on how to position actions to align with their respective funding sources or future plans. The CAC also advises the Steering Committee on engagement strategies and project deliverables. Members of the CAC reviewed the outcomes of the stakeholder surveys and feedback collected at meetings to guide the final recommendation to the ACCR Steering Committee for the actions and implementation strategies.

Finally, focus groups (also known as “community conversations”) were established that include members of the communities of Brigantine, Atlantic City, Ventnor, Margate, Longport, Northfield, Pleasantville, and Atlantic County. Focus groups include residents, businesses, environmental and youth institutions, and utilities. Focus groups were also formed for socially vulnerable populations including low-income people, seniors, people with disabilities, and people with Limited English Proficiency (LEP) (including immigrants). Nine focus groups were created to provide local perspective and guidance on community assets, needs, vision, potential community challenges to planned scenarios, and the actions that would have the greatest impact on their respective community.



Branding was consistent to foster participation and ownership for the region’s stakeholders. Source: NJDEP

The engagement strategy was designed to be thorough and consistent throughout the development of the Action Plan’s. Steering Committee meetings were held virtually each month. Focus group, TAC, and CAC meetings were held during key milestones (project outset/vision, review of draft scenarios, and presentation of the Preferred Scenario). In addition, public meetings were held at key intervals to introduce new material and gain

iterative feedback. A public website was created to help establish a central digital repository of information. A crowdsourcing mapping tool also provided a 24/7 opportunity for public engagement and allowed users to help identify problems and develop strategies to improve resilience to flooding impacts, enhance public safety and quality of life, reduce the risk from future extreme weather events, and advance intermunicipal and regional coordination. Branding for the Action Plan’s development ensured that it resonated with the communities of the region. Social media, particularly in the wake of COVID-19, was used to maximize public participation and the potential for feedback.

The engagement strategy was developed based on a core belief that a comprehensive regional resilience plan must respond to the challenges and opportunities identified by the region’s residents and stakeholders. The strategy’s “Listening” phase was critical to the collection of “soft” data, or experiences and other qualitative perspectives from community members. This listening phase yielded key insights regarding chronic challenges, geographic areas of importance or vulnerability, critical assets to community members, and an understanding of past approaches to coastal resilience and their effectiveness. This approach was critical in the establishment of a regional vision. The listening-based engagement strategy was also used to gain meaningful feedback as deliverables in the Action Plan development were presented to different committees and to the public. The engagement strategy played a critical role in consolidating a Preferred Scenario, as actions were chosen based directly on the feedback received through the engagement process.

See **Appendix B, Community and Stakeholder Engagement Plan**, for more detail on the ACCR community engagement strategies. The Community and Stakeholder Engagement Plan for the ACCR was adjusted throughout the project based on lessons learned, the needs of the project, and to ensure the most effective outreach strategies were in place to solicit meaningful input at critical points in the project.

## 1.4 Risk and Critical Issues

The Resilient NJ process prioritized a comprehensive “data-gathering” approach as an initial step in the development of planning scenarios that would eventually form the Action Plan. As part of the Planning Context development and early engagement sessions with stakeholders, critical issues, areas of vulnerability, and chronic challenges that have a unique impact on the region were identified. The Planning Context summarized key climate risks that were identified in past plans and policies, many of which were informed or changed by the impacts of Superstorm Sandy in 2012. High tide flooding and extreme storms were identified as two major categories of coastal impact that affect the ACCR. These acute risks are compounded by the area’s physical vulnerability to a changing climate, including sea level rise (SLR), which is expected to only increase the frequency and intensity of high tide flooding and extreme storms.

Beyond physical vulnerability, coastal challenges in the ACCR are further compounded by the area’s inclusion of socially vulnerable and overburdened populations (SVPs), defined as individuals prone to negative health, financial, and housing impacts from natural disasters who can have difficulty recovering from such events. In communities like Atlantic City and Pleasantville, SVPs may be the least likely to have access to essential services in the wake of a major storm or do not have the ability to proactively mitigate the impacts that chronic stressors like high tide flooding can have on their livelihoods. See **Figures 1-3 and 1-4**. While recent planning efforts have made strides to prioritize SVPs, their disproportionately high share within the ACCR shows that a regional Action Plan for resilience must incorporate social and economic aspects to serve all community members.

Figure 1-3. Range of Socioeconomic Status in the ACCR

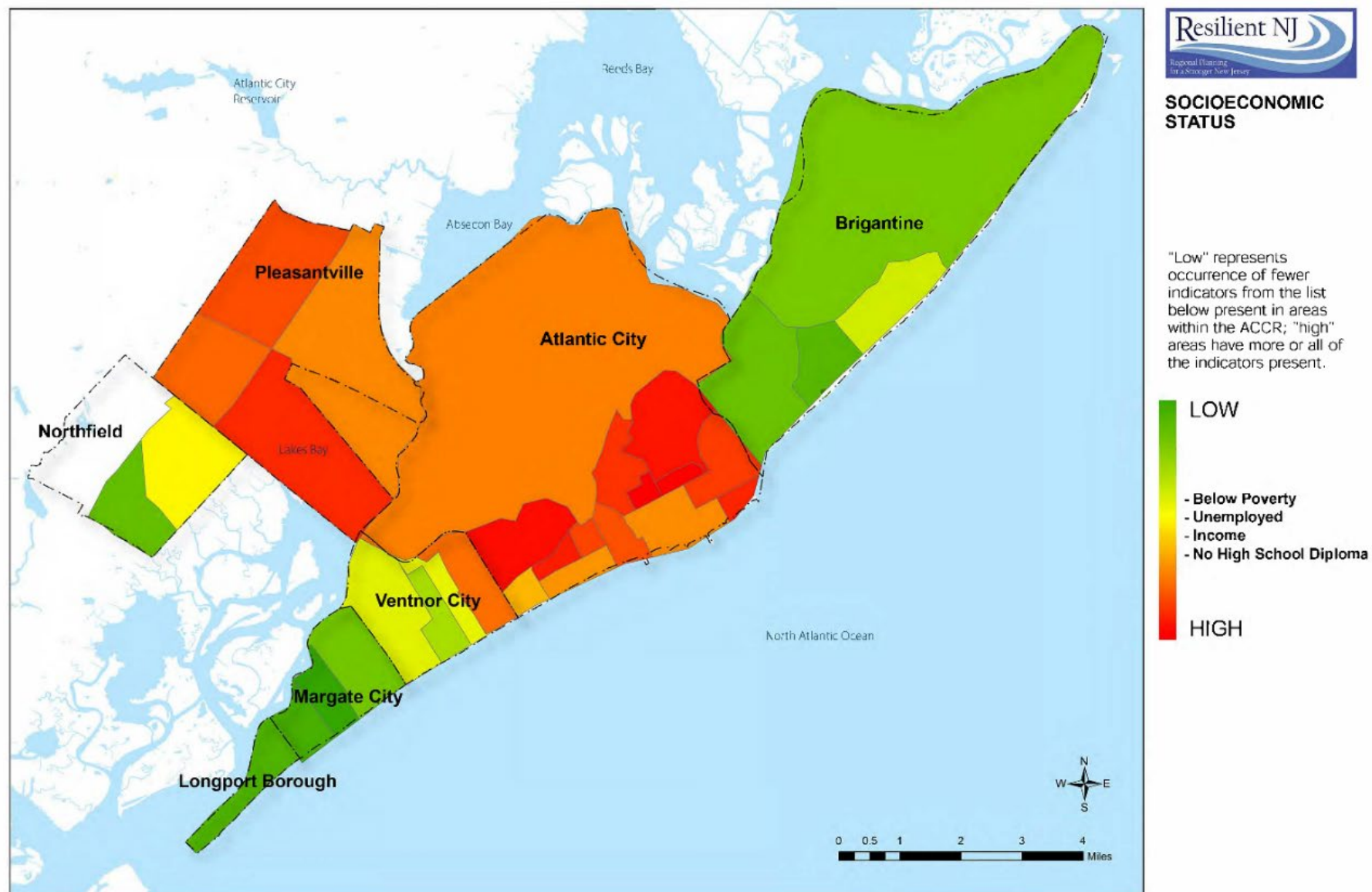
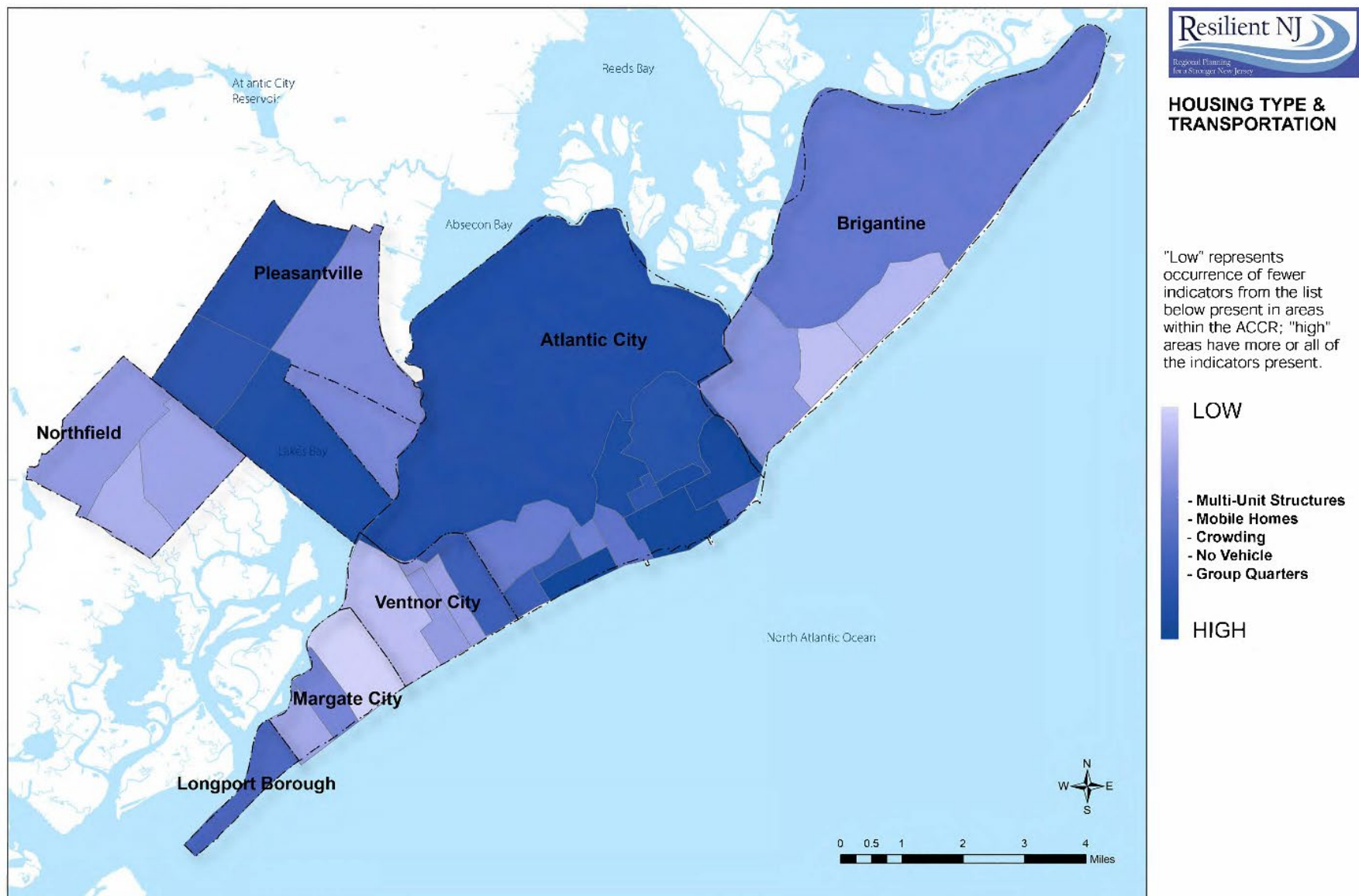


Figure 1-4. Housing/Transportation Socially Vulnerable Populations in the ACCR

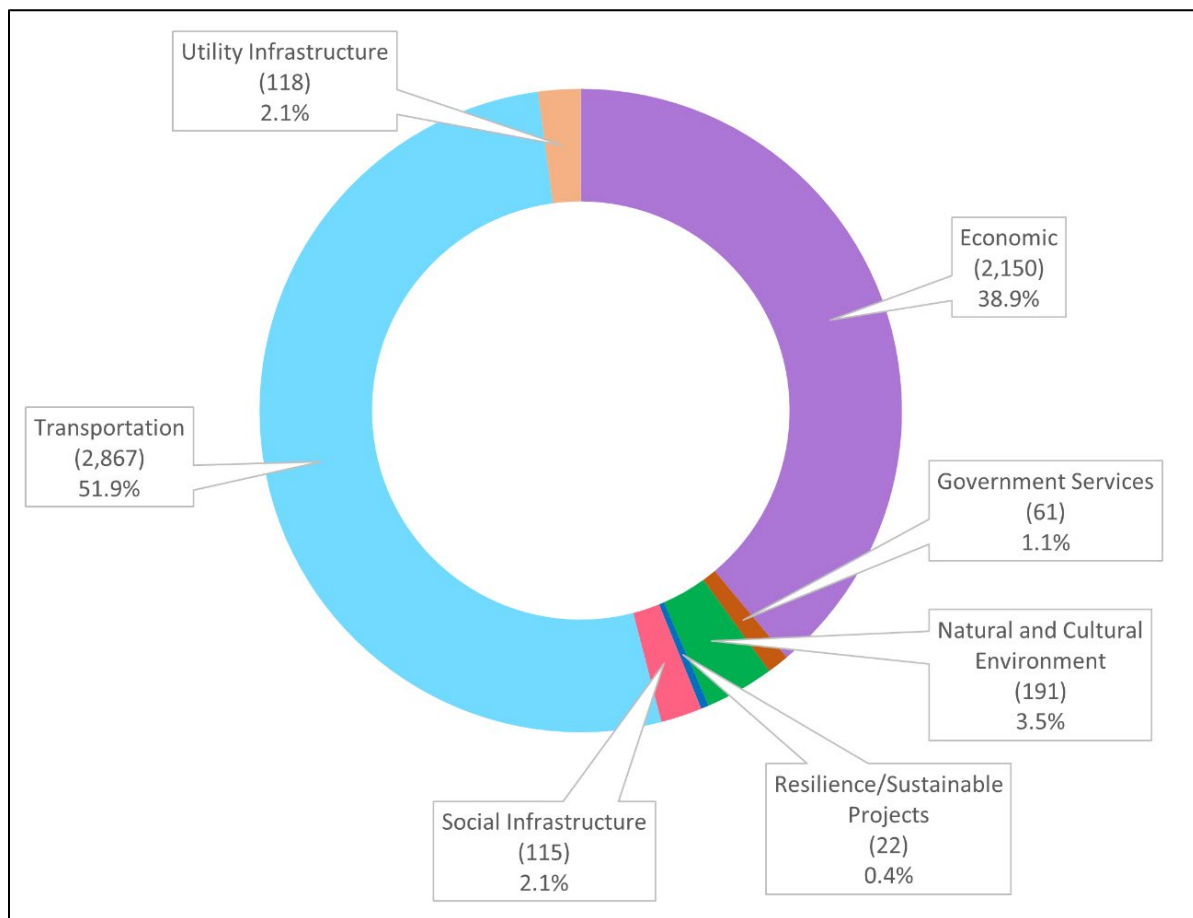


Much of the early work in the development of the Action Plan culminated in a regional asset inventory and risk assessment report (see **Appendix C, Asset Collection and Risk Assessment Report**). This report identifies the importance and vulnerability of critical assets in the region, using the inventory of assets compiled during the initial Project Context phase of work. Critical assets were defined as those that play a significant role in the community functions of the region, from among the many health and safety, economic, educational, and social and recreational activities that characterize well-functioning towns. See **Figure 1-5**. The risk assessment builds on the Planning Context work and the community engagement interactions that inventoried and cataloged the important assets of the region from health and safety, and government services to infrastructure systems, education, recreation, and the economy.

Three main steps compose the process for assessing risk for critical assets:

- ❖ Identify, classify, and map assets and their functions and roles locally and in the ACCR.
- ❖ Prioritize the most critical assets in the project area.
- ❖ Explore and illuminate the relationships between and among critical assets, including geographic proximity, to help evaluate the potential for implementing actions and projects that would improve their resilience and protect (or provide alternatives to) their functions.

**Figure 1-5. Asset Inventory**





WSP relied on desktop analysis and conversations with community members to develop a full repository of assets (more than 6,000 individual assets, not including housing) in the region. Meetings with stakeholders helped orient the type of assets that were important to residents and municipal operations. A crowdsourced map received more than 100 comments that helped inform the team of problem areas, resilience investments that have already been made, and recommendations of what might be needed. Ultimately, an asset criticality analysis was used to prioritize the assets that would be a major focus of the Action Plan.

A screening approach helped identify the most critical assets for life-safety (such as assets involved in evacuation functions, debris removal, public safety, temporary shelter planning, emergency response systems, and utility and infrastructure systems). Based on stakeholder engagement and outreach and feedback, the following assets are considered important and matter most to the community.

- ❖ Government facilities and actions that help protect health and public safety.
- ❖ Transportation systems: Most critical are evacuation routes, followed by roads, transit, bike paths, marinas, and parking garages that allow a return to homes or support local accessibility after evacuation, and a return to businesses by employees and freight movement.
- ❖ Key community infrastructure: education (schools, daycare), social services.
- ❖ Business/economic assets: banks, offices, restaurants, retail.
- ❖ Natural and cultural environments: wetlands, bird migration observation sites, wildlife areas, museums, Lucy the Elephant, historic sites.

The planning team determined the prioritization criteria for assets based on feedback from the Steering Committee. The two key elements of the criticality analysis included (1) the probability of lost function due to flooding (such as whether an asset has been subject to recurrent or severe flooding in the past), and (2) the consequence of lost function due to flooding (indicating the degree to which people, services, or other assets would be affected by an extreme weather event). These two factors—the likelihood of flood impact and the effect of such flood on community function—were used to help score all evaluated assets and create a list of the most critical and vulnerable assets. See **Figure 1-6**, which shows the list of assets during the prioritization process.

As noted earlier, the identification of critical assets was an important step before a comprehensive risk assessment for the region could be completed. The risk assessment was guided by the methodology outlined for Resilient NJ pilot areas, and it considered the monetized, quantified, and qualified risk from specific flooding conditions. The risk assessment relied on geospatial tools and analysis such as HEC-RAS and Hazus modeling to understand how mapped critical assets would be affected, and what the general value of building structures at risk would be. However, a financial-centric analysis (such as is available through Hazus modeling) does not fully capture the importance of health, safety, and mobility assets in the region. To broaden the understanding of risk, particularly in a region like the ACCR, which is an employment and recreation center for South Jersey, a criticality analysis was used to evaluate risk for assets, facilities, and communities not normally considered in a traditional risk analysis. A list of those evaluated loss types is shown in **Table 1-3**.

Figure 1-6. ACCR Top At-Risk Assets

Municipality	Asset Category	Asset Type	Name	Latitude	Longitude	Conseq. of Flooding	Risk Level*	Depth of Flooding, Rounded (feet)										Sandy + 2070 SLR	
								SLR, 2030	SLR, 2050	SLR, 2070	2% 2hr	2% 2hr + 2% 2hr + 2% 6%	2% 2hr + 1% 24hr + 1% 24hr + 10%	1% 24hr	2% 24hr	6%	10%		
Northfield City	Social Infrastructure	Nursing Home/Assisted Care Facilities	Meadowview Nursing and Rehabilitation Center	39.38	-74.54	5	14.71	-	-	-	1.34	1.37	1.45	1.51	2.77	2.80	2.87	2.94	-
Brigantine City	Utility Infrastructure	Sewer Lift Station	Sewer Lift Station Sheridan Station	39.4155982	-74.37709808	5	14.16	-	-	2.33	0.70	0.76	0.85	2.56	2.35	2.37	2.31	2.83	7.94
Pleasantville City	Utility Infrastructure	Communication	Tower:WOND-AM (Pleasantville)	39.39009857	-74.51210022	4	13.35	1.29	1.89	2.89	0.94	1.65	2.20	3.06	1.97	2.39	2.72	3.34	8.50
Atlantic City	Utility Infrastructure	Communication	Tower:WFGP-AM (Atlantic City)	39.3783989	-74.44760132	4	12.66	1.45	2.05	3.05	0.70	1.49	2.10	3.10	0.77	1.55	2.16	3.16	8.66
Brigantine City	Utility Infrastructure	Water Well	Water Well #6	39.41630173	-74.35579681	5	11.85	0.57	1.17	2.17	0.11	0.76	1.31	2.23	0.32	0.95	1.48	2.37	7.78
Pleasantville City	Utility Infrastructure	Communication	Tower:WGMG-FM	39.39400101	-74.50900269	4	11.02	0.70	1.30	2.30	0.17	0.89	1.49	2.46	0.83	1.50	1.98	2.75	7.91
Pleasantville City	Social Infrastructure	Health care	Pharmacy:Rite-Aid Pleasantville	39.39110184	-74.53230286	5	10.99	-	-	-	0.96	1.00	1.08	1.14	2.06	2.08	2.14	2.20	-
Pleasantville City	Economic	Retail Trade	PATEL, PRAVIN	39.391115	-74.530536	3	10.86	-	-	-	2.41	2.45	2.53	2.59	3.48	3.51	3.57	3.62	-
Atlantic City	Utility Infrastructure	Communication	Tower:WFGP Radio Tower (Conway)	39.37900162	-74.44740295	4	10.27	0.85	1.45	2.45	0.13	0.90	1.50	2.50	0.22	0.96	1.56	2.57	8.06
Atlantic City	Social Infrastructure	Shelter facilities	Atlantic City Pal Building	39.36539841	-74.43180084	5	9.44	-	-	-	1.11	1.13	1.17	1.21	1.80	1.82	1.86	1.89	5.72
Pleasantville City	Economic	Retail Trade	PATEL, PRAVIN	39.39086952	-74.53058886	3	8.24	-	-	-	1.61	1.64	1.72	1.77	2.61	2.64	2.69	2.75	-
Brigantine City	Transportation	Marina	Brigantine Marina & Paddle Club	39.39310074	-74.40720367	2	8.16	2.35	2.95	3.95	1.60	2.40	3.01	4.01	1.68	2.47	3.08	4.08	9.56
Egg Harbor Township	Economic	Entertainment & Recreation	BAYVIEW MARINA LLC	39.35221061	-74.53919077	2	7.88	2.20	2.80	3.80	1.45	2.25	2.86	3.86	1.53	2.33	2.94	3.94	9.41
Atlantic City	Economic	Retail Trade	RIPAC LLC C/O EDMUND C WIDEMAN, III	39.35709848	-74.4260735	3	7.67	-	-	-	2.02	2.03	2.07	2.10	2.47	2.48	2.53	2.56	5.09
Atlantic City	Economic	Retail Trade	SPATOLA, SALVATORE	39.36614915	-74.41742408	3	7.57	-	-	-	2.02	2.03	2.06	2.08	2.45	2.47	2.50	2.52	6.03
Pleasantville City	Economic	Retail Trade	GUENTHER, FRANCIS J	39.39107024	-74.53501978	3	7.45	-	-	-	1.21	1.25	1.33	1.39	2.33	2.36	2.42	2.48	-
Pleasantville City	Economic	Retail Trade	SEASHORE ENTERPRISES INC	39.38906287	-74.53533642	3	7.35	-	-	-	1.24	1.28	1.35	1.40	2.31	2.34	2.40	2.45	-
Pleasantville City	Transportation	Bus stops	NEW RD AT RT 40/322	39.39110184	-74.53119659	2	7.18	-	-	-	2.37	2.41	2.49	2.55	3.45	3.48	3.54	3.59	-
Egg Harbor Township	Economic	Lodging	YASH KAILASH INC	39.38042459	-74.493499	3	7.03	0.54	1.14	2.14	0.68	0.85	1.30	2.24	1.05	1.22	1.50	2.34	7.75
Northfield City	Natural and cultural Environment	Park	Glen Cove Park	39.35549927	-74.54940033	3	6.97	0.57	1.17	2.17	-	0.65	1.24	2.24	0.14	0.79	1.35	2.32	7.78
Margate City	Utility Infrastructure	Waste water treatment	MARGATE CITY	39.32220078	-74.51370239	5	6.81	-	-	0.14	0.73	0.77	0.81	0.91	1.29	1.28	1.32	1.36	5.75
Pleasantville City	Housing	Apartments	NJBF00079777	39.412801	-74.505965	2	6.79	-	-	-	0.05	0.13	0.31	0.50	3.06	3.13	3.25	3.39	4.38
Pleasantville City	Natural and cultural Environment	Park	Clematis Avenue Park	39.37519836	-74.5279988	3	6.72	0.48	1.08	2.08	-	0.55	1.15	2.15	0.25	0.73	1.27	2.24	7.69
Pleasantville City	Housing	Affordable Housing	Pleasantville Twr Annex	39.39475169	-74.53830023	4	6.59	-	-	-	0.60	0.62	0.70	0.88	1.54	1.56	1.60	1.65	-
Longport Borough	Government Services	Fire Station	Fire station:Longport Fire Department	39.31150055	-74.52780151	5	6.39	-	-	-	0.86	0.87	0.90	0.89	1.28	1.30	1.33	1.28	5.28
Pleasantville City	Transportation	Bus stops	RT-40/322 AT NEW RD	39.39149857	-74.53179932	2	6.19	-	-	-	1.87	1.91	1.99	2.05	2.96	2.99	3.04	3.10	-
Northfield City	Natural and cultural Environment	Park	Stillwater Park	39.37400055	-74.53279877	3	6.17	-	0.55	1.55	0.74	0.80	1.06	1.84	1.10	1.16	1.38	2.06	7.16
Pleasantville City	Economic	Retail Trade	APPLE FARM LLC & LEJO CORP	39.39524561	-74.53925173	3	5.92	-	-	-	1.00	1.03	1.09	1.17	1.84	1.87	1.92	1.97	-
Atlantic City	Economic	Commercial	Harrah's	39.38518524	-74.42903137	3	5.90	-	-	0.42	0.92	1.21	1.44	1.81	1.10	1.38	1.61	1.97	6.03
Margate City	Social Infrastructure	Shelter facilities	W. H. ROSS III SCHOOL	39.33100128	-74.50219727	5	5.84	-	-	-	0.45	0.47	0.51	0.54	1.09	1.11	1.14	1.17	4.56
Pleasantville City	Economic	Retail Trade	GUENTHER BROS LLC	39.39042534	-74.53387478	3	5.70	-	-	-	0.65	0.69	0.77	0.83	1.76	1.79	1.84	1.90	-
Egg Harbor Township	Economic	Lodging	DAND, JANAK N. & HANSA J.	39.38410027	-74.50301852	3	5.61	0.07	0.67	1.67	-	0.39	0.93	1.76	0.66	1.07	1.34	1.87	7.28
Pleasantville City	Natural and cultural Environment	Places of Worship	Place of Worship:Grace Church	39.38570023	-74.53520203	4	5.56	-	-	-	0.41	0.42	0.45	0.48	1.17	1.21	1.31	1.39	-
Atlantic City	Transportation	Bus stops	South Carolina Ave at Mediterranean Ave	39.36689922	-74.42949677	2	5.43	-	-	0.98	1.87	1.89	1.94	2.00	2.63	2.65	2.69	2.72	6.59
Egg Harbor Township	Economic	Lodging	YASH KAILASH INC	39.380184	-74.492975	3	5.39	0.01	0.61	1.61	0.17	0.36	0.78	1.70	0.63	0.75	0.99	1.80	7.22
Atlantic City	Housing	Apartments	NJBF00069943	39.365125	-74.416674	2	5.36	-	-	-	2.07	2.08	2.12	2.15	2.60	2.62	2.65	2.68	5.94
Egg Harbor Township	Economic	Retail Trade	JTD REALTY GROUP LLC	39.39826796	-74.54037186	3	5.31	-	-	-	1.02	1.04	1.08	1.11	1.63	1.66	1.71	1.77	-
Egg Harbor Township	Economic	Retail Trade	JUST ALIGNMENTS & TIRES LLC	39.3848685	-74.505222	3	5.30	-	0.51	1.51	-	0.25	0.79	1.61	0.55	0.96	1.26	1.77	7.13
Margate City	Government Services	Municipal Buildings	Margate City Hall	39.32229966	-74.51370239	5	5.27	-	-	-	0.43	0.47	0.51	0.61	0.98	0.98	1.01	1.05	5.44
Brigantine City	Utility Infrastructure	Sewer Lift Station	Sewer Lift Station A-Station	39.41339874	-74.36830139	5	5.17	-	-	0.48	0.10	0.11	0.14	0.69	0.70	0.70	0.73	1.03	6.09
Pleasantville City	Housing	Apartments	NJBF00079802	39.412904	-74.505742	2	5.17	-	-	-	-	-	-	-	2.25	2.32	2.44	2.58	3.56
Pleasantville City	Housing	Apartments	NJBF00079740	39.412694	-74.505638	2	5.13	-	-	-	-	0.03	0.14	0.25	2.25	2.31	2.43	2.56	3.47
Northfield City	Economic	Technical/Business Services	TEPEDINO, REGINA	39.36624374	-74.56289736	3	5.09	-	-	-	0.47	0.49	0.54	0.58	1.58	1.60	1.65	1.70	-
Atlantic City	Transportation	Gas Station	Atlantic County Facilities Management	39.36750031	-74.42990112	3	5.08	-	-	-	0.91	0.93	0.97	1.02	1.61	1.63	1.67	1.69	5.56
Pleasantville City	Housing	Apartments	NJBF00079737	39.412617	-74.505554	2	5.02	-	-	-	0.13	0.16	0.26	0.37	2.21	2.27	2.38	2.51	3.34
Pleasantville City	Housing	Apartments	NJBF00079760	39.412726	-74.505991	2	4.97	-	-	-	-	-	-	-	2.16	2.22	2.35	2.49	3.47
Egg Harbor Township	Economic	Lodging	AKSHARPRIT LLC	39.38408426	-74.50332877	3	4.96	-	0.45	1.45	-	0.17	0.72	1.54	0.46	0.87	1.14	1.65	7.06
Northfield City	Economic	Technical/Business Services	TEPEDINO, REGINA	39.36634828	-74.56357488	3	4.95	-	-	-	0.76	0.79	0.84	0.88	1.53	1.56	1.60	1.65	-
Egg Harbor Township	Economic	Retail Trade	DO, DUNG	39.38034116	-74.49375715	3	4.90	-	0.39	1.39	-	0.09	0.55	1.53	0.26	0.46	0.75	1.63	7.00
Pleasantville City	Economic	Retail Trade	CAIRNS, THOMAS & ELEANOR	39.390348	-74.5328035	3	4.83	-	-	-	0.37	0.41	0.49	0.55	1.47	1.50	1.55	1.61	-
Atlantic City	Economic	Retail Trade	M B MARKLAND CONST CO	39.37033965	-74.42141666	3	4.79	-	-	0.45	1.00	1.03	1.08	0.99	1.75	1.78	1.80	1.60	6.06
Pleasantville City	Economic	Retail Trade	CGF ASSOC	39.39132721	-74.53009933	3	4.76	-	-	-	0.37	0.41	0.49	0.55	1.45	1.48	1.53	1.59	-
Longport Borough	Government Services	Municipal Buildings	Borough Hall	39.31230164	-74.52739716	5	4.74	-	-	0.20	0.35	0.45	0.54	0.72	0.59	0.70	0.79	0.95	5.81
Pleasantville City	Housing	Apartments	NJBF00079744	39.412657	-74.505716	2	4.70	-	-	-	-	-	-	-	2.03	2.09	2.21	2.35	3.31

\* Note: Risk Level = [Consequence of Flooding] x [1% 24hr + 10% Flood Depth]

Source: ACCR Planning Team. Note: a full list of the top at-risk assets is included as an Appendix C.

**Table 1-3. Evaluated Loss Types**

<b>Loss Type</b>	<b>Source/Analysis Method</b>	<b>Quantified/Monetized/Qualitative</b>
Impacted Recreational Assets	Loss of recreational value of marinas	Monetized
Impacted Ecosystem Services	Economic value of ecosystem services per acre	Monetized
Incurred Mental Health Treatment Costs (\$)	FEMA sustainability benefits methodology	Monetized
Evacuation Route Vulnerability to Flooding	Percent of road and rail evacuation routes directly inundated by storm surge with depth greater than 6 inches, the project threshold for impassable routes	Quantified
Socially Vulnerable Assets	Number of assets directly inundated (by any percent of building damage) by storm surge	Quantified
Increased Commuting Time	Flood impacts to roads/rail with depth greater than 6 inches, the project threshold for impassable	Qualitative
Water Supply	Flooding of drinking water infrastructure; wells, pumps, treatment facilities	Qualitative
Wastewater	Flooding of sewer infrastructure; lift stations, sewer pipe, and control facilities	Qualitative

Beyond the evaluation of risk to critical assets, the risk assessment identified structural analysis and other monetized, quantitative, and qualitative risks from a range of specific flood conditions. See **Table 1-4**.

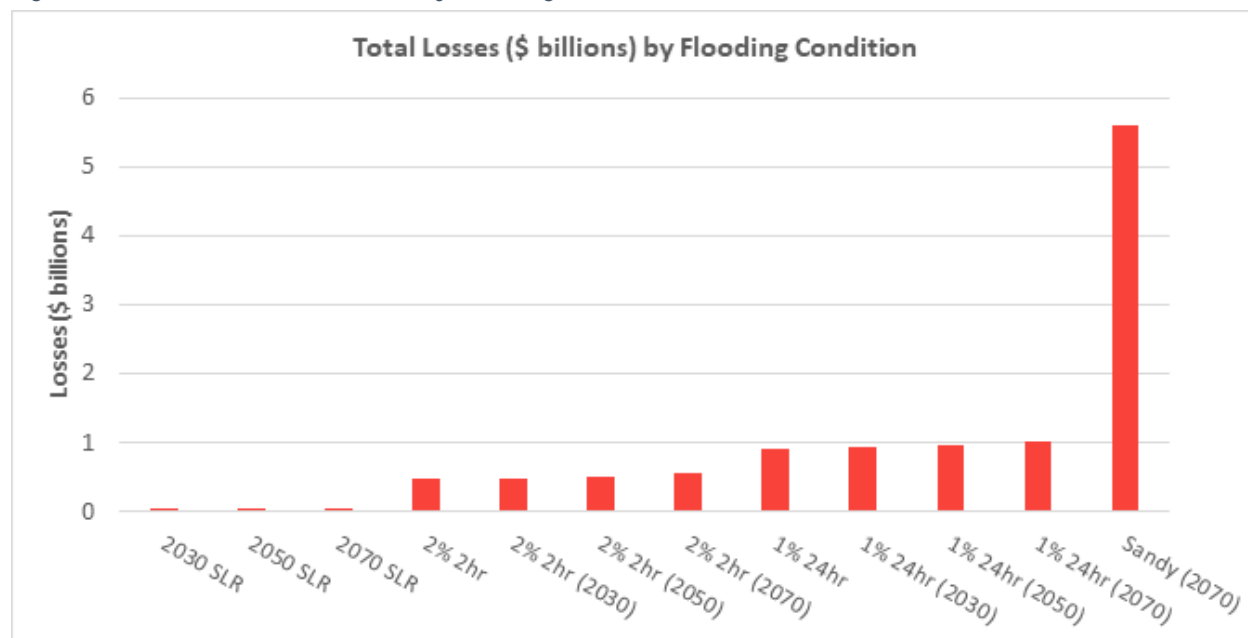
**Table 1-4. Flooding Conditions for Risk Assessment**

Flooding Condition	Type
<b>Current</b>	MHHW + 2% annual chance, 2-hour storm rainfall
	MHHW + 1% annual chance, 24-hour storm rainfall
<b>Future</b>	MHHW + SLR 2070 (2.4 feet)
	MHHW + SLR 2070 (2.4 feet) + (2% annual chance, 2-hour storm rainfall + 10% increase in rainfall)
	MHHW + SLR 2070 (2.4 feet) + (1% annual chance, 24-hour storm rainfall + 10% increase in rainfall)
	MHHW + SLR 2070 (2.4 feet) + Superstorm Sandy in 2070 storm surge (High Water Mark = 8.3 feet)

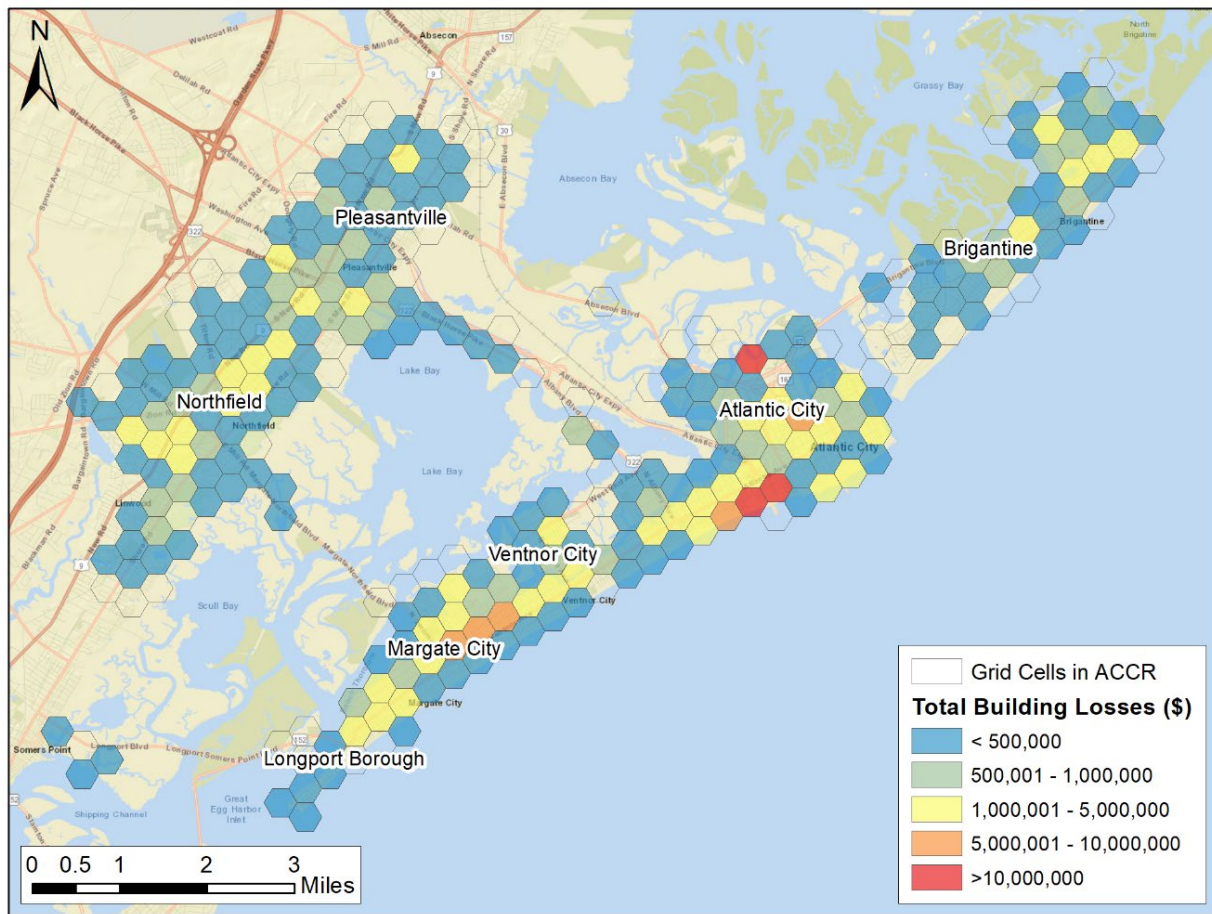
Note: MHHW = Mean Higher High Water; SLR = Sea Level Rise

Hazus results produced an estimate of structural and content damages for all buildings in the most recent Hazus building footprint data set. Damages are shown in dollars and percentages of the buildings being impacted, and **Figure 1-7** shows the estimated losses per building per scenario, while **Figure 1-8** shows how these losses are distributed across the region.

**Figure 1-7. Total Losses (\$ billions) by Flooding Condition**



**Figure 1-8. Building Losses Across the ACCR**

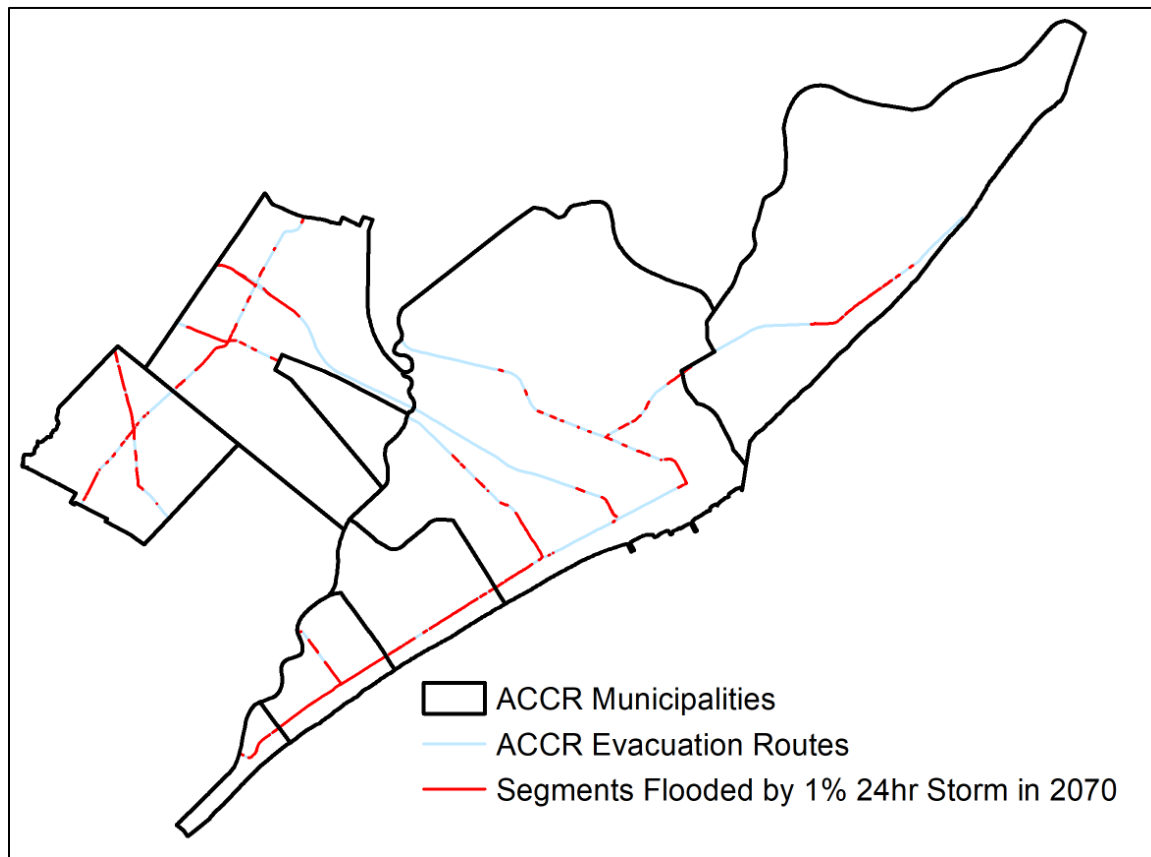


Note: Figure shows the MHHW + SLR 2070 (2.4 ft) + (1 percent annual chance, 24-hour storm event + 10 percent increase in rainfall) flood condition

Other monetized, quantified, and qualified losses showed that the flood conditions assessed have disproportionately high impacts on evacuation routes and services needed by local community groups. A geographic analysis showed that more than 13 miles of evacuation route length would be inundated during a 1 percent, 24-hour storm in 2070, as shown in **Figure 1-9**.



*Figure 1-9. Impacted Evacuation Routes During 1 Percent, 24-Hour Storm in 2070*



Other important outputs from the monetized, quantitative, and qualitative analysis show that more than 50 social service and community resources (i.e., childcare facilities, places of worship, gas stations, libraries, nursing homes, and schools) would be affected by a 1 percent, 24-hour storm in 2070. While most of the social services/community resources impacts are distributed evenly across the ACCR, some affected asset types are concentrated in specific municipalities. All of the childcare facilities and places of worship that would be affected are in Atlantic City and Pleasantville, while all libraries and police stations that would be affected are in Longport. All affected county properties are in Atlantic City and Northfield, and the majority of affected schools are in Atlantic City.

The ACCR is also home to a diverse coastal ecosystem that supports community functions in the form of recreation, small storm impacts, and services such as carbon sequestration. The risk assessment considers the economic value of these ecosystem services by leveraging the acreage of various ecosystem types and a per-acre value estimate of each ecosystem type. **Table 1-5** shows the acreage at risk from a 1 percent, 24-hour storm in 2070, and the value those at-risk lands provide the community through resources, recreation, or other services that benefit quality of life. Given the large area of coastal wetlands the ACCR has in its “back bays,” as well as other critical ecosystems lining the shores of Absecon Island, Brigantine Island, and along the shore of Pleasantville, the potential risk of loss is quite high for the region.

**Table 1-5. ACCR Land Use and Land Cover Value at Risk**

<b>Land Use/Land Cover Type</b>	<b>Acreage</b>	<b>1% Storm Value at Risk</b>
Beach	167.1	\$9,835,048.45
Coastal Shelf	6092.3	\$11,054,704.04
Cropland	0.0	\$ --
Forest	209.2	\$431,320.84
Freshwater Wetland	23.4	\$378,166.50
Grass/Rangelands	320.4	\$34,907.71
Riparian Buffer	0.0	\$ --
Saltwater Wetland	431.2	\$3,691,925.74
Urban Greenspace	354.3	\$1,223,793.36
Total At Risk	0.0	\$26,649,866.64

See **Appendix C, Asset Collection and Risk Assessment Report**, for additional information on the ACCR risk assessment and critical assets.

## 1.5 Summary of the Vision

As part of the engagement strategy, it was critical for the Steering Committee to consider the current and future regional challenges and communities' interests to create a vision that encompasses how the region sees itself functioning in the future and to identify the qualities, objectives, and goals for the region. Developing the vision was an essential aspect of engagement and was discussed with project stakeholders and partners. The vision bridges the evaluation of existing conditions and the current and future flood risks documented in the vulnerability and risk assessment with the community's long-term interests and its identity as a water-oriented economy and culture. The mission emphasizes that flexibility is paramount in addressing the near-, medium-, and long-term nature of the resilience opportunities and challenges facing the region.

The ACCR vision, the mission of the ACCR Resilient NJ Regional Resilience and Adaptation Action Plan, and the values and goals of stakeholders expressed during the engagement process are provided below.

## The ACCR Vision

The Resilient New Jersey Atlantic County Coastal Region is a resilient and sustainable place where protections from natural disasters, flooding, and sea level rise enable the region to thrive; residents' sense of belonging and pride in their communities is enhanced by advancing quality of life through fair housing, accessible transportation, infrastructure improvements, and a diversified economy; and visitors are offered inviting recreational and cultural experiences that honor the ocean and optimize the waterfront, public space, and regional assets that make the region an iconic destination.

## The ACCR Mission

Develop a flexible roadmap that looks out to the year 2070 and presents strategic actions and proposed solutions to reduce the worst effects of increased precipitation, sea level rise, and coastal storms over the next 50 years; and ensure the needs and goals of residents, visitors, and businesses of the Atlantic County Coastal Region are heard and incorporated throughout the development and implementation of the Resilient NJ Regional Resilience and Adaptation Action Plan (RRAAP).

## ACCR's Values

- ❖ Friendly & inclusive: welcoming to diverse residents and visitors year-round
- ❖ A special place in the state, region, and country: preservation and enhancement of ACCR's unique characteristics—natural and human-made—that it set it apart from other destinations
- ❖ Stronger together: understanding that the region will continue to experience challenges over time and collaboration leads to greater safety and success
- ❖ Thriving communities: numerous economic, educational, and recreational opportunities with a diverse and growing workforce, improved connectivity and mobility, and social equity and environmental justice at the heart of decision-making and investments
- ❖ Resilience and adaptation: able to minimize negative effects, manage emergencies, recover rapidly when challenges arise, and rejuvenate over time in the face of climate change

## ACCR's Goals

- ❖ **Protect Critical Infrastructure, Ecology, and Cultural Assets**
  - **Conscientious investment.** Provide infrastructure improvements that create benefits in proportion to the need, considering historical public investment patterns in the region, and without causing displacement.
  - **Efficiency and equity.** Ensure response and adaptation strategies to current and future climate change disruptions and damage to infrastructure and communities are efficient and equitable, including infrastructure improvements and nature-based solutions that minimize vulnerability and consequences.
  - **Improve regional coordination and build alliances** to share resources and information, access funding, and implement flood resilience measures that drive effective emergency response, promote ecological integrity of local landscapes, and preserve historic and cultural assets of the region.

- **Preserve important plant and animal populations and habitats**, conserve marshlands and wetlands, and promote beneficial reuse of resources (e.g., dredged materials) to improve viability and biodiversity while reducing impacts of flooding, storm surges, and coastal storms.

#### ❖ **Protect Residents' Ability to Stay in the Region**

- **Innovation in design.** Design critical infrastructure to ensure continued service to all communities during and after major storm events and in the face of rising sea levels and intensifying storms that impact urban and natural landscapes.
- **Neighborhood character and features.** Preserve and enhance neighborhood features that represent and are cherished by the people who live here.
- **Agility and balance.** Be agile in balancing human needs and limitations in land use, environmental, engineering, policy and funding-related decision-making. Improve local expertise and civic engagement in understanding climate hazards and preparedness strategies and related trade-offs for development and investment.
- **Education and collaboration.** Facilitate topical education for residents to empower their input and collaboration on project development, prioritization and outcomes, improve information dissemination and planning for the next flood, and ensure access to safe, equitable and quality resources associated with climate resilience.

#### ❖ **Diversify Economic, Research, and Employment Opportunities**

- **Hyperlocal workforce.** Create hyperlocal workforce development opportunities to support projects and promote small businesses.
- **Diversify economy.** Continue to diversify the economy to include additional water-oriented tourist attractions and businesses, as well as offshore renewable energy and strengthen ecotourism, hospitality, and retail industries.
- **Research and development imperatives.** Strengthen research and educational sectors to not only advance innovation, but also improve and expand public awareness of the region's hazards.

Several takeaways were revealed through the development of the ACCR vision, mission, values, and goals. Stakeholders value the ACCR as a place where people throughout the state, country, and beyond routinely come to connect with each other and with nature. People gather in this region for conventions, competitions, pageants, research, collaboration, and innovation. The region is critical to South Jersey's economy, providing jobs in service, transportation, energy, healthcare, marine, and education sectors. The area values its large employers and also sees the small businesses as the lifeblood of the region. The area is rich in ecological resources and values its marshlands, parks, beaches, and waterways. It is characterized by its diversity of people, destinations, landscapes, activities, and ways of getting around. The region has continually reinvented itself and is a place that works together to meet the challenges of the future. The region is focused on innovation to harness opportunities in green technologies. Building on these takeaways, general themes emerged. The themes in **Table 1-6** build on the region's strengths and opportunities within the context of the level of risk identified in the Asset Collection and Risk Assessment Report (**Appendix C**) vulnerability assessment.

**Table 1-6. Regional Vision Themes**

1. Improve emergency coordination and adapt to SLR and changing climate conditions.
2. Advance with the times on new technologies, industries, and infrastructure systems.
3. Revitalize tourism, leisure, and recreational opportunities along the beach, bays, and transit hubs.
4. Diversify the economy to include increased focus on climate adaptation and renewable energy.



Image: ACCR team evaluating existing beach fill project.

See **Appendix D, Visioning Report**, for additional details on the ACCR visioning process.

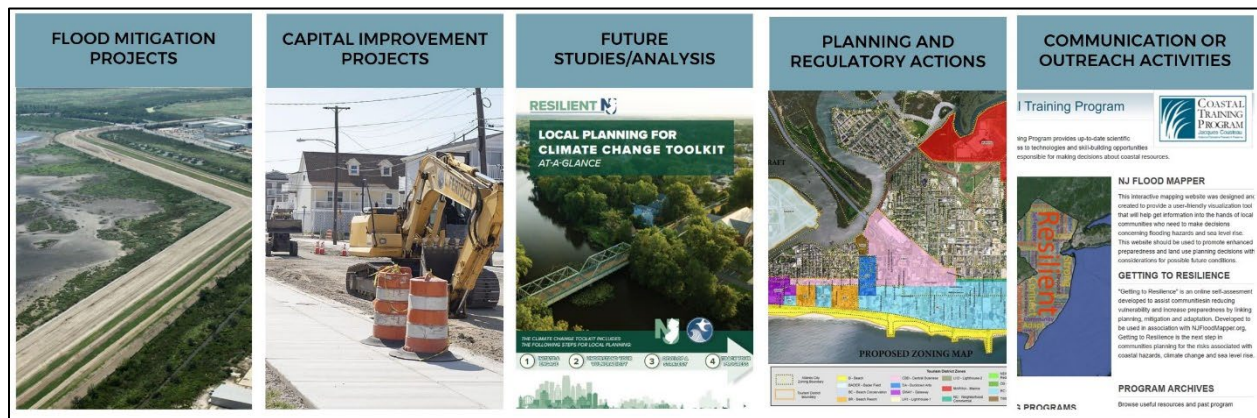
## 1.6 Discussion of Additional Resilience Indicators Not Included in the Resilience and Adaptation Scenario Evaluation Tool

As noted throughout the Planning Context and Risk Assessment portions of the Action Plan development, many of the challenges and risks identified are further compounded by the high percentages of SVPs in the region, as well as the region's importance to the broader economy as a job and recreational center in South Jersey. These themes highlight the importance for planning scenarios that deal holistically with climate risks. As part of this evaluation, a framework was developed to help guide how the actions can be implemented with specific consideration for social equity. This holistic approach means that actions considered in the scenarios should have social and economic benefits on top of their ability to protect from coastal risks.

## 2 SCENARIOS

The ACCR Action Plan development process included evaluating various pathways to reduce anticipated flood risk by 2070 through a suite of actions, referred to as a Resilience and Adaptation Scenario, that work collectively to increase resilience over time. Three distinct Resilience and Adaptation Scenarios (scenarios) were developed as part of the Resilient NJ planning process to allow stakeholders and decision-makers to understand the various pathways to enhancing resilience and addressing climate change in the region over the next 50 years. The scenarios include different types of actions, including Flood Mitigation Projects, Capital Improvement Projects, Future Studies and Analysis, Planning and Regulatory Actions, and Communication or Outreach Activities (Figure 2-1).

Figure 2-1. Actions Considered in the Resilience and Adaptation Scenarios



The three scenarios were organized to help the Steering Committee and stakeholders clarify their thinking about the different approaches to addressing the region's most salient adaptation challenges and as a tool to help determine regional priorities.

### RESILIENCE AND ADAPTATION SCENARIO GOALS

1. Respond to the vision identified by the region.
2. Reduce anticipated flood impacts in 2070.
3. Include actions that respond to immediate flooding concerns within the region.
4. Protect or enhance natural resources and ecosystem function, as well as public access.
5. Address the needs of socially vulnerable populations.

While these scenarios encompass a diverse suite of actions, each scenario addresses the seven challenges facing the region, as identified through the engagement process, risk assessment, and planning analysis:

- ❖ Shoreline Protection
- ❖ Stormwater Management
- ❖ Access and Transportation
- ❖ Power and Communications
- ❖ Equitable Economic Development
- ❖ Public Facilities
- ❖ Vulnerable Populations



The three scenarios also embody the key elements of the ACCR vision. The actions are focused on building the ACCR's capacity as a region, which is fundamental in addressing long-term resilience of the region's seven municipalities.

Each of the three scenarios is structured around a different conceptual approach to adaptation and implementation. Each includes implementable actions that incorporate ongoing initiatives as well as more innovative methods and visionary strategies for long-term resilience.

Common to all three scenarios are a set of five region-wide actions that address shared challenges across the region in a way that would yield multiple benefits.

1. Develop "The Absecon Bay Living Bay Master Plan," a framework to establish conditional monitoring, prioritize actions for habitat restoration, and create a means to streamline permit reviews.
2. Establish the Absecon Baykeeper, a non-profit organization dedicated to stewardship of Absecon Bay, working on behalf of the people and wildlife that depend on the Bay, through environmental action, advocacy, and education.
3. Implement a regional initiative to translate all emergency preparedness materials to multiple languages spoken in the region. Atlantic City is one of the country's most diverse communities in terms languages spoken, and this initiative would entail translation to over eight languages.
4. Implement a program focused on the evaluation and improvement of preparedness actions for SVPs focusing on shelters, evacuation, outreach, and education and social services and wellness.
5. Include measures such as elevating electrical and mechanical equipment, installing solar panels, reprogramming vulnerable ground level residential units, and developing long-term strategies for the most vulnerable communities in the Action Plans for all Atlantic City Housing Authority and Pleasantville Housing Authority Communities and the region's senior communities.

## 2.1 Overview of the Scenario Options

This section of the report provides a brief overview of each scenario by indicating the differences in approach that each scenario uses to achieve resilience. This section also includes the Resilience and Adaptation Scenario Evaluation Tool graphic (color wheel) that was used in the process of choosing and prioritizing the actions according to the benefits they bring to the resilience of the region.

### **Scenario 1: Gray Infrastructure Led by Public Sector**

Scenario 1 is oriented toward gray infrastructure solutions (see **Figure 2-2**). This scenario relies on a mix of actors for implementation but is more centralized in nature, looking primarily to federal and state-led partnerships with local municipalities to address coastal protection.

On the Absecon Bay side, this scenario calls for the implementation of the recommendations featured in the USACE's Back Bays Study that proposes a cross-bay barrier, a continuous floodwall along the northern edge of Absecon Island in Atlantic City, and the construction of the Great Egg Harbor Inlet Storm Surge Barrier adjacent to the Downbeach area.<sup>1</sup> This scenario adopts this same approach along

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<sup>1</sup> Downbeach includes the communities of Longport, Margate, and Ventnor.

the entire length of Brigantine's Absecon Bay shoreline, which is not within the line of protection in the Back Bays Study Plan. On the ocean-side, this scenario calls for installing a sheet pile dune core to fortify the dunes in the Absecon Island municipalities and Brigantine. It also calls for constructing a sea wall on the northern end of Brigantine, which has been identified as a critical gap.

The community considers the risk from stormwater most acutely on a regular basis. To address the increasing frequency of more intense rain events, Scenario 1 proposes installing a combination of new pump stations and raising selected roads with a focus on those that feed into evacuation routes.

To maintain post-disaster continuity of electrical and communications service, this scenario proposes a suite of three actions: (a) hardening all aboveground utility poles and burying power lines where possible; (b) installing new generators at selected public buildings and using these to power new microgrids; and (c) expanding the Atlantic City Midtown Microgrid study (an ongoing funded initiative) to nearby local merchants on Atlantic Avenue to allow for the continued provision of food and healthcare services in post-disaster situations. This scenario also maintains continuity of services by local retail establishments through a program to protect each of the area's primary commercial corridors and retail centers.

Figure 2-2. Scenario 1 Actions



## **Scenario 2: Gray and Green Solutions Led by the State, County and Municipalities**

Scenario 2 adopts a mix of gray and green adaptation solutions (see **Figure 2-3**). This scenario also relies on a mix of actors but looks toward the region's municipalities (Atlantic City, Brigantine, Longport, Margate, Ventnor, Northfield, and Pleasantville), the county, and the state to partner on needed resilience improvements.

On the ocean-side, Scenario 2 continues the Beach Nourishment Program with a gradual elevation increase to address surge and SLR over time. To address vulnerability on the Absecon Bay side, this scenario proposes using the assets within the control of the individual municipalities. This scenario proposes raising the roads closest to and paralleling the shoreline in all five Absecon Island municipalities and Brigantine by linking multiple streets to form a continuous multipurpose levee. This levee is envisioned to include a Greenway trail for pedestrians and/or cyclists, thus offering recreational benefits as well.

As a companion to the Greenway, this scenario proposes a “Absecon Bay Blueway.” This Blueway would be a network of interconnected kayak/canoe trails connecting different parts of Absecon Bay and potentially linking to the Great Bay to the north and the Great Egg Harbor Bay to the south. The Blueway could not only help raise awareness of the bay and its ecological importance to the region, but it would also provide a new recreational outlet and contribute to the region's economic development.

For stormwater management, this scenario features a feasibility study and pilot program: “Blue Streets,” an innovative “smart infrastructure” approach to managing groundwater to mitigate flooding. This approach, which couples subsurface sensors with pump stations to lower groundwater in advance of major precipitation events, has been successfully deployed in similar contexts in the United States. The purpose of the study would be to identify the locations where Blue Streets could be most effective in this region, with the goal of funding a pilot project in Atlantic City.

To maintain post-disaster continuity of electrical and communications service, Scenario 2 proposes a community microgrid study to identify optimal locations for microgrids in each of the region's municipalities. The study would focus on public facilities, casino/hotels, and other major sites that could support emergency power generation and microgrids to supply power to vulnerable populations, essential small businesses, and medical facilities in the immediate vicinity. This study would require coordination with Atlantic City Electric (ACE).



Figure 2-3. Scenario 2 Actions



### **Scenario 3: Nature-based Solutions Leveraging Private Investment**

Scenario 3 is oriented more toward nature-based adaptation solutions (see **Figure 2-4**). This scenario takes a more diverse approach to implementation, relying on state, local, non-profit, and private sector partnerships, and leveraging private investment to help finance needed resilience improvements.

Scenario 3 takes a public-private approach to bayside protection. The key concept is to allow increased densities and encourage assemblages of individual single-family bayfront lots to attract private investment. New development projects would be required to implement shoreline improvements (e.g., living shorelines, site raising) that would provide long-term protection to upland areas. This strategy is based on a phenomenon that has been occurring organically in the Downbeach communities, Brigantine, and the northern end of Atlantic City where improvements to bayside shoreline protection have been occurring as individual properties change hands. On the ocean-side, Scenario 3 proposes offshore breakwaters to mitigate storm surge.

Scenario 3 also proposes revising the zoning in two corridors within the region to allow for greater density. The two areas identified, along the Black Horse Pike north of Florence Avenue in Pleasantville, and Atlantic Avenue in Atlantic City, are less vulnerable relative to other area neighborhoods, are along major established corridors, and enjoy access to transit. Zoning changes would be coupled with development of vision plans for integrating public realm and flood mitigation improvements to make these areas more attractive for development. Greater density in these areas would allow for economic development opportunities and expand opportunities for housing for those potentially displaced as more vulnerable areas become too expensive to protect.

This scenario also encourages rezoning properties adjacent to Atlantic City Harbor for maritime oriented/Blue Economy uses. The goal is to better take advantage of the one location in the entire region with a harbor able to support Blue Economy-related uses. Zoning ordinances would allow the area to transform over time while preserving nearby historic neighborhoods. Attracting Blue Economy enterprises in this area would open the possibility for partnerships with the state, which is actively encouraging these types of industries. Such partnerships would create new jobs and attract the private capital needed to make improvements in shoreline protection that would protect upland neighborhoods.

The U.S. Coast Guard occupies a strategic location on the Absecon Inlet, at the mouth of the harbor. Should the Coast Guard decide to decommission this site, Atlantic City could ensure that the land is redeveloped for uses that will support maritime related/Blue Economy uses.

For stormwater management, this scenario features a “Living Streets Feasibility Study and Pilot Project.” This would include the Blue Streets program described in Scenario 2 and a focus on Green Streets” to identify locations where green infrastructure measures such as stormwater streets, swales, as well as porous pavement would be most effective. Incorporating Green Streets would allow for natural infiltration to mitigate downstream flash flood risks taking pressure off municipal storm sewer systems. The “Living Streets Feasibility Study and Pilot Project” would also fund a pilot Living Streets pilot project in Atlantic City.



Figure 2-4. Scenario 3 Actions



To improve the region’s ability to maintain post-disaster electrical and communications service, Scenario 3 takes a more decentralized approach, looking to encourage actions by private property owners by requiring installation of solar panels for all renovation and new construction projects above a specified dollar amount to increase energy resilience during power outage. This scenario also features an incentive program to encourage installation of solar trellises at surface parking lots and batteries at all buildings to increase the capacity for individual property owners to maintain electrical power independently of the grid in post-disaster situations. Encouraging installation of batteries would also allow for bidirectional charging for electric vehicles, which would address potential gas shortages in post-disaster situations.

## 2.2 Key Differences

Scenarios 1, 2, and 3 summarized above differ in the structure of organizations and operations that will lead interventions in the region. Scenario 1 features a top-down intervention that would be led by government organizations and involves infrastructure solutions addressing large-scale effects of a storm or disaster event. Scenario 2 focuses on a mix of infrastructure and green (nature-based) solutions governed by the state, county, and municipal organizations in coordination. Scenario 3 takes a decentralized approach and proposes leveraging private organizations in implementing nature-based solutions in the local context of communities.

See **Appendix E, Scenario Development Memos**, and **Appendix F, Scenario Visualization Products**, for more information on the three scenarios.

## 2.3 Selection Process of the Preferred Scenario

One fundamental aspect of the selection process was that the individual actions developed in each of the three scenarios could be combined to develop a Preferred Scenario, or one of the three scenarios, as proposed, could be adopted as the Preferred Scenario. The Resilient NJ planning process included a Resilience Checklist, Scenario Completeness Questionnaire, and a Resilience and Adaptation Scenario Evaluation Tool to promote the development of creative and holistic actions during the planning process and evaluate how successfully the scenarios align with the resilience indicators. The Resilience Checklist assisted with the brainstorming process and the development of a diverse suite of actions within each scenario in alignment with nine resilience indicators. A Scenario Worksheet was used to document the comprehensive set of actions identified in each scenario. Some actions could be included in all three scenarios, while other actions could be included in one scenario. Once the three scenarios were developed, the planning team used the Scenario Completeness Questionnaire (see **Table 2-1**) as a check point to determine whether the scenarios address each of the resilience indicators and provide a comprehensive approach to increasing resilience across the region.

*Table 2-1. Example of Scenario Completeness Questionnaire*

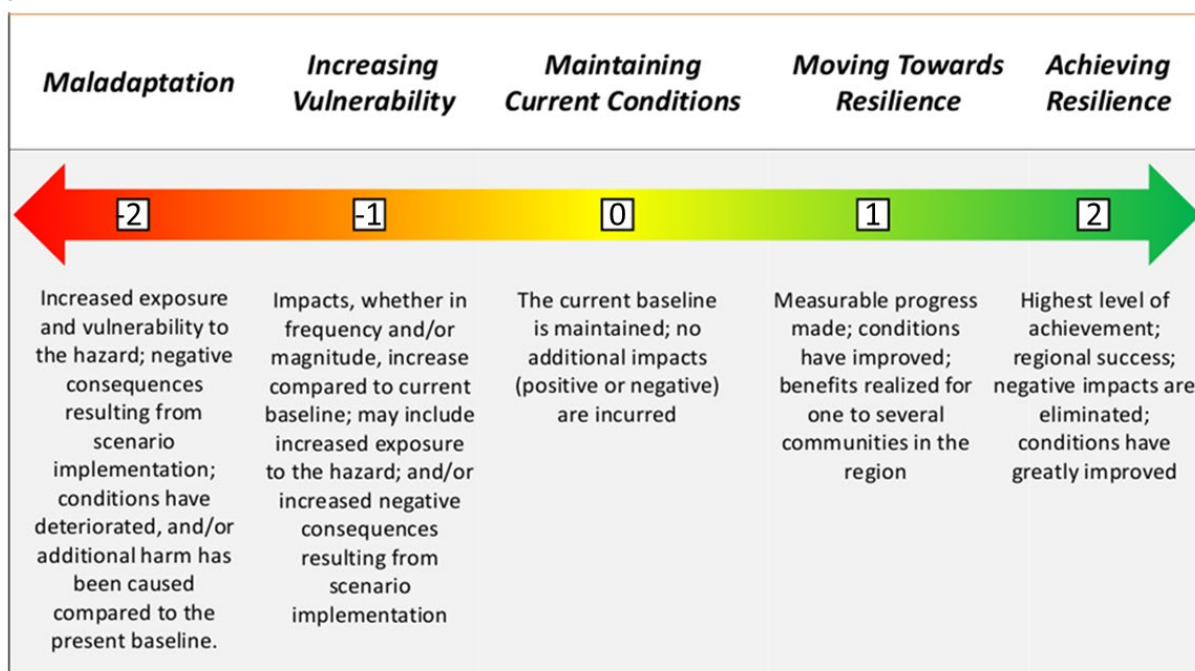
RESILIENCE INDICATOR	<b>QUESTIONS</b> <b>The indicator questions should first be responded with Yes or No answers. If answers are Yes, then the respondents will continue the evaluation tool.</b>
<b>Vision</b>	Does the Resilience and Adaptation Scenario support the overall community vision?
<b>Risk</b>	Does the Resilience and Adaptation Scenario reduce risk/adapt the region to life with risk?

<b>RESILIENCE INDICATOR</b>	<b>QUESTIONS</b> <b>The indicator questions should first be responded with Yes or No answers. If answers are Yes, then the respondents will continue the evaluation tool.</b>
<b>Cost</b>	Is the overall scenario cost effective?
<b>Capacity</b>	Does the region have the capability and capacity to implement the Resilience and Adaptation Scenario?
<b>Environmental</b>	Does the Resilience and Adaptation Scenario use nature-based solutions to enhance the local environment?
<b>Adaptation/Timeframe</b>	Has a timeline for implementation of each Resilience and Adaptation Scenario action been established?
<b>Outreach &amp; Partnership</b>	Does the Resilience and Adaptation Scenario take into consideration community engagement and outreach?
<b>Health and Populations</b>	Does the Resilience and Adaptation Scenario equally strengthen health outcomes and the overall resilience of diverse populations?
<b>Socioeconomic</b>	Does the Resilience and Adaptation Scenario strengthen/diversify the social, cultural, and economic characteristics of the region?
<b>Additional Indicator</b>	Does the Resilience and Adaptation Scenario strengthen/diversify the social, cultural, and economic characteristics of the region?

Once the planning reviewed the Scenario Completeness Questionnaire for completeness,, the team used the Resilience and Adaptation Scenario Evaluation Tool to evaluate each scenario against the resilience indicator categories. Within the evaluation tool, questions aligned with each indicator were answered using a gradient scale ranging from 2 (highest score, strongly agree), to -2 (lowest score, strongly disagree) to indicate the agreement for each category of the indicator questions (see **Figure 2-5**). Once the questions were completed, the median value of each set of indicator questions became the overall resilience ranking for each indicator. The median value was then correlated to the Resilience Indicator Scale to illustrate the performance of each scenario in each resilience indicator category. The average of all the indicators corresponds to the overall resilience ranking for the scenario as a whole.



Figure 2-5. Evaluation Tool Gradient Scale



The results of this evaluation process for all three scenarios can be summarized as follows:

#### **Scenario 1: Gray Infrastructure Led by Public Sector**

Scenario 1 moves toward resilience in four categories including vision, capacity, health and population, and socioeconomic indicators. The scenario aligns with the identity of the region and supports the overall community vision. The region has some capacity to implement capital improvement actions that are ongoing, but larger-scale infrastructure projects will also require increased capacity through federal and state-led partnerships. The region-wide actions move toward improving conditions for SVPs and include actions to protect ratables and strengthen the community's overall quality of life. Reliance on gray infrastructure, especially large-scale projects such as the USACE's Back Bays Study, reduces risk, fortifies the region against large superstorm events, and scores well when considering the level of protection provided to the region's critical assets. However, the overall municipal cost share is high for the implementation of large-scale infrastructure solutions such as cross-bay barriers, or floodwalls, and a storm surge barrier, which results in a lower score for the cost indicator. There are potential environmental effects on the back bays due to the construction of large-scale gray infrastructure solutions. In addition, the reliance on large-scale gray infrastructure solutions does not provide long-term actions that are flexible and can be modified if flooding projections change.

#### **Scenario 2: Gray and Green Solutions Led by the State, County, and Municipalities**

Like Scenario 1, Scenario 2 moves toward resilience in the vision, capacity, health and population, and socioeconomic indicator categories. The scenario aligns with the identity of the region and supports the overall community vision through a mix of gray and green adaptation solutions. In specific, a focus on the water is a key feature of the region's identity and the nature-based "green" solutions such as the Absecon Green/Blue Way and stormwater conveyance through Blue Streets build awareness around water and the key role natural assets play in flooding protection. Scenario 2 also moves toward resilience in the adaptation/timeframe and environmental indicator categories. The incorporation of

green solutions such as Blue Streets and smart infrastructure sensors are adaptable over time, and the level of protection can be modified if flooding projections change. There are also potentially fewer environmental effects on the region overall through less reliance on large-scale gray infrastructure approaches and a move toward integrating smaller-scale green solutions that preserve green and open space to increase floodplain capacity. Adopting a mix of gray and green adaptation solutions still reduces risk and provides a high level of protection to the region overall including critical assets. The reliance on partnerships between the region's municipalities, the county, and the state to implement the resilience actions will likely be more attainable from a financial cost-share perspective than Scenario 1 but could still challenge the current financial capacity of the region.

### **Scenario 3: Nature-based Solutions Leveraging Private Investment**

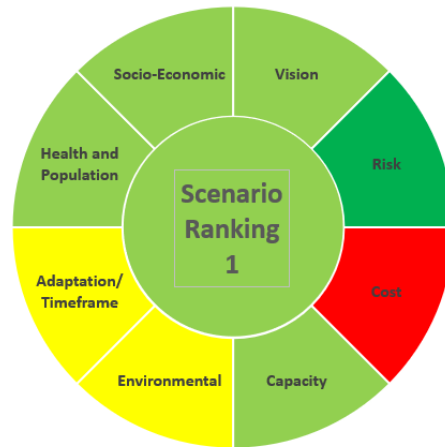
Like Scenario 1 and 2, Scenario 3 moves toward resilience in the vision, capacity, health and population, and socioeconomic indicator categories. Scenario 3 is oriented more toward nature-based adaptation solutions, and as such, it scores well and achieves resilience in the adaptation/timeframe and environmental indicator categories. The decentralized approach of Scenario 3, including leveraging private organizations in implementing nature-based solutions and shoreline protections in the local context of communities, increases the flexibility and the ability of the smaller-scale actions to be adaptable over time and allows the level of protection to be modified if flooding projections change. The green, nature-based actions, including adapting existing parks and creating new stormwater management parks and Living Streets that combine Blue Streets subsurface stormwater conveyance without pipes with networked green infrastructure create new green space and open space, improve environmental conditions, increase floodplain management capacity, and increase the use of the nature-based stormwater management and green infrastructure as a flood mitigation strategy. Adopting local development strategies and nature-based adaptation solutions still reduces risk and provides a high level of protection to the region overall including critical assets. In addition, since Scenario 3 takes a more diverse approach to implementation, relying on state, local, non-profit, and private sector partnerships and leveraging private investment to help finance needed resilience improvements, identifying financial assistance measures at the municipality level could be achieved.

See **Figure 2-6** for a graphic representation of the evaluation tool results for each of the ACCR scenarios. See **Appendix G, Scenario Evaluation Materials**, for more information on each scenario and the evaluation process.

**Figure 2-6. Evaluation Tool Results for ACCR Scenarios**

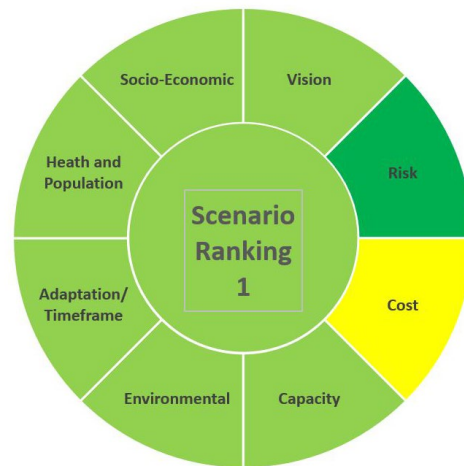
**Evaluation Results for Scenario 1: Gray Infrastructure Led by the Public Sector**

Resilience Indicator	Ranking
<i>Vision</i>	1
<i>Risk</i>	2
<i>Cost</i>	-2
<i>Capacity</i>	1
<i>Environmental</i>	0
<i>Adaptation/ Timeframe</i>	0
<i>Health and Population</i>	1
<i>Socioeconomic</i>	1
<b>Scenario Ranking</b>	<b>1</b>



**Evaluation Results for Scenario 2: Gray and Green Solutions Led by the State, County, and Municipalities**

Resilience Indicator	Ranking
<i>Vision</i>	1
<i>Risk</i>	2
<i>Cost</i>	0
<i>Capacity</i>	1
<i>Environmental</i>	1
<i>Adaptation/ Timeframe</i>	1
<i>Health and Population</i>	1
<i>Socioeconomic</i>	1
<b>Scenario Ranking</b>	<b>1</b>



**Evaluation Results for Scenario 3: Nature-based Solutions Leveraging Private Investment**

Resilience Indicator	Ranking
<i>Vision</i>	1
<i>Risk</i>	2
<i>Cost</i>	1
<i>Capacity</i>	1
<i>Environmental</i>	2
<i>Adaptation/ Timeframe</i>	2
<i>Health and Population</i>	1
<i>Socioeconomic</i>	1
<b>Scenario Ranking</b>	<b>1</b>





Once the evaluation process for all three scenarios were completed, the planning team presented the three scenarios to the ACCR Steering Committee for feedback. The planning team also conducted individual feedback sessions with each of the Steering Committee representatives, including the ACCR seven municipalities, Atlantic County, and the American Red Cross, to facilitate a more in-depth dialogue about each of the scenarios at a community level. The three scenarios were also presented at two interactive, virtual public meetings held on February 10, 2022. As the planning team presented each scenario at the meetings, the public had the opportunity to respond to polls to communicate their level of support for each action. A summary of key feedback on the three scenarios from the ACCR Steering Committee, individual municipalities, and the public is provided in **Table 2-2**.

**Table 2-2. Summary of Key Feedback on the Three Scenarios**

Scenario	Steering Committee/Municipality Feedback	Public Feedback
Region-wide Actions (included in all scenarios)	<ul style="list-style-type: none"> <li>❖ General support for Living Bay Master Plan.</li> <li>❖ Importance of reusing clean dredge material (clogging at outfalls) at low-lying development locations (e.g., Bader Field, The Cove and Borgata).</li> <li>❖ Adaptation Plan for Housing Authority Communities – Walter Buzby and Stanley Village upgrades/rebuild – short-term investment opportunity to incorporate adaptation measures into current projects.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Overall support for each of the regional actions</li> <li>❖ Preference for Living Bay Master Plan and Adaptation Action Plan for Housing Communities and Senior Communities</li> </ul>
Scenario 1	<ul style="list-style-type: none"> <li>❖ USACE Back Bays Study – communities have adopted resolutions that mention short-term improvements and the need for USACE support.</li> <li>❖ Prefer other options for ocean protection (do not extend boardwalk; consider steel bulkhead with floodgates).</li> <li>❖ Road raising – raise some roads where necessary that are below 5 to 7 feet.</li> <li>❖ Support burying power lines.</li> <li>❖ Use Atlantic City Midtown Microgrid as a model.</li> <li>❖ Install emergency generators at all critical facilities, emergency operations centers, shelters, and schools.</li> <li>❖ Include recommendations for resilience improvements for the Atlantic City Municipal Utilities Authority (ACMUA) water treatment plant in Pleasantville and the Atlantic County Utilities Authority (ACUA) sewer plant in Atlantic City.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Preference for Pump Stations and USACE Back Bays Plan</li> </ul>

Scenario	Steering Committee/Municipality Feedback	Public Feedback
Scenario 2	<ul style="list-style-type: none"> <li>❖ Support for breakwaters.</li> <li>❖ Stormwater utilities – provide for a source of funding to maintain flood protection systems.</li> <li>❖ Raised bayside streets and relationship to elevating homes. Develop state program to front the cost to elevate house and pay the local match for FEMA grants to make it affordable to homeowners who need to assistance.</li> <li>❖ Build on the fact that ACCR is a model for energy efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Preference for Pump Stations</li> <li>❖ Interest in Raised Bayside Streets and Blue Streets</li> </ul>
Scenario 3	<ul style="list-style-type: none"> <li>❖ Support for offshore breakwaters.</li> <li>❖ Municipalities should be encouraged to adopt stormwater management regulations (cisterns, blue roofs, and rain gardens).</li> <li>❖ Living Streets – select locations, potential pilot in Atlantic City.</li> <li>❖ Encourage community solar, wind power, roof top solar, tree and landscaped areas, and open space.</li> <li>❖ Gardner’s/Delta Basin – Maritime/Blue Economy– mixed use (not just industrial). Adjacent to stable neighborhood; Minimum disruption to social fabric.</li> <li>❖ Encourage the development of a Resilience and WIND Institute in Atlantic City to bolster the economy and to continue research and development efforts.</li> <li>❖ Additional vacant sites for Blue Economy.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Preference for decentralized solar, rezoning to encourage Blue Economy Land Uses, and Living Streets</li> </ul>
Overall Preferences	<ul style="list-style-type: none"> <li>❖ N/A</li> </ul>	<ul style="list-style-type: none"> <li>❖ Blue Streets</li> <li>❖ Living Bay Master Plan</li> <li>❖ Living Streets</li> <li>❖ Upzone Bayside Frontage</li> <li>❖ Raised Bayside Streets</li> <li>❖ Offshore Breakwaters</li> </ul>

### 3 PREFERRED SCENARIO NARRATIVE

The planning team used the scenario evaluation process results and the feedback from the ACCR Steering Committee, individual municipalities, and the public to develop a Preferred Scenario (see **Figure 3-1**). See **Appendix G, Scenario Evaluation Materials**, for more information on the Scenario Worksheet for the Preferred Scenario and the evaluation process.

The Preferred Scenario was formulated by combining various scenario action items from the three scenarios because feedback received from the ACCR Steering Committee, individual municipalities, and the public indicated support for actions within each of the three scenarios and consensus on creating a “blended” approach to the Preferred Scenario by combining gray and green solutions. The actions chosen for the Preferred Scenario were articulated further based on the challenges they address, including shoreline protection, stormwater management, access and transportation, power and communication, equitable economic development, vulnerable populations, and public facilities. The actions within each challenge category were prioritized based on their effectiveness and feasibility that was explored further within the feedback received from the ACCR Steering Committee, community and stakeholder groups, local and municipal organizations, and the public. In addition to actions addressing specific challenges, strategies that would reinforce the resilience of the region in the long term and concern capacity building and natural resources have been incorporated into the Preferred Scenario. For the Preferred Scenario, the actions were woven together to propose a comprehensive roadmap that offers options to address short-term threats and risks, as well as long-term plans to implement for more established adaptation strategies. Some actions that were proposed in the original three scenarios are now included in the Preferred Scenario as a feasibility study or a pilot project because feedback and engagement sessions indicated community resistance and financial challenges as potential obstacles for implementation. Further development and refinement of individual actions was also informed by additional feedback received through meetings and presentations of the Preferred Scenario to the ACCR Steering Committee, the public, the six CACs, and Focus Groups held in spring 2022. A summary of key feedback on the Preferred Scenario is provided in **Table 3-1**.

Figure 3-1. Preferred Scenario Actions



*Table 3-1. Summary of Key Feedback on the Preferred Scenario*

Challenge Category	Steering Committee/CAC Feedback	Focus Group Feedback
Regional Actions	<ul style="list-style-type: none"> <li>❖ Support for Living Bay Plan.</li> <li>❖ Absecon Bay Keepers - build on organizations that already exist.</li> <li>❖ Explore partnerships with non-profits and educational institutions (e.g., Stockton, The Nature Conservancy).</li> <li>❖ Wetland Restoration – incorporate short-term actions.</li> <li>❖ Multi-Jurisdictional Natural Hazard Mitigation Plan Atlantic County – short-term projects that set the stage for Resilient NJ.</li> <li>❖ Emergency Preparedness: <ul style="list-style-type: none"> <li>• Resilient NJ can raise attention to improvements needed for SVPs (Emergency Managers and Red Cross).</li> <li>• Use existing Red Cross models for preparedness actions (e.g., youth clubs in schools, neighborhood captains).</li> <li>• Ensure emergency preparedness materials represent the community and that the messaging is understood.</li> <li>• Outreach and Education – identified as an area of focus as a first step.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>❖ Participants felt that the draft actions were well-developed and addressed many of their concerns and challenges relating to preparedness.</li> <li>❖ LEP individuals emphasized the need for documentation. Participants also underlined the importance of mental health. The group acknowledged the potential empowerment the community has in addressing these challenges. They also highlighted the need for better signage and wayfinding for evacuation routes.</li> <li>❖ Low-income individuals raised issues about mental health services, hospital advocacy for ill or injured, community-level capacity to respond to disaster, and need for trust law enforcement for effective evacuations.</li> <li>❖ Seniors raised importance of designated social media/media for updates during emergency events, evacuation drills, non-shelter sites, and overall support for preparedness.</li> <li>❖ People with disabilities stressed the need for preparedness and resources related to mental, emotional, and behavioral health.</li> </ul>
Power and Communications	<ul style="list-style-type: none"> <li>❖ Generators: Install new generators at all critical facilities, Emergency Operation Centers, shelters, and schools (plan for continuous power generators, solar, microgrids as future technology).</li> <li>❖ Update zoning and building codes to accommodate renewable energy.</li> <li>❖ Expand community solar on municipal owned land.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Low-income individuals stressed the importance of cyber and electrical grid security preparedness.</li> <li>❖ Seniors expressed the importance for communication support and communication infrastructure during emergency events.</li> </ul>

Challenge Category	Steering Committee/CAC Feedback	Focus Group Feedback
Shoreline Protection	<ul style="list-style-type: none"> <li>❖ Recognition of effective partnership with USACE.</li> <li>❖ Bayshore Continuous Shoreline Protection Study – longer-term strategic plan that does not supersede other municipal projects but builds on those projects. Views are important.</li> <li>❖ Support for offshore breakwaters. Support for a groin in Brigantine.</li> <li>❖ Overall support for the Blue Way concept and additional recreation/education options.</li> <li>❖ Further evaluate the Green Way. <ul style="list-style-type: none"> <li>• There are specific areas where a trail along the water is feasible but recognize there are many private landowners along the bay.</li> </ul> </li> <li>❖ Elevate roadways in strategic locations (e.g., evacuation routes).</li> </ul>	<ul style="list-style-type: none"> <li>❖ See comments for Regional Actions.</li> </ul>
Stormwater Management	<ul style="list-style-type: none"> <li>❖ Support for new pump station locations.</li> <li>❖ Living Streets – recognize challenges (sand, dewatering subsidence, ROW patching). Need to understand feasibility longer term. Potential in commercial parking lots or other areas.</li> <li>❖ Resiliency improvements for the ACMUA water treatment plant in Pleasantville and the ACUA sewer plant in Atlantic City.</li> <li>❖ Consider critical infrastructure during any road elevation projects.</li> <li>❖ Municipalities should be encouraged, not required, to adopt stormwater management regulations by retaining or reusing stormwater with cisterns, blue roofs, and rain gardens.</li> </ul>	<ul style="list-style-type: none"> <li>❖ See comments for Regional Actions.</li> </ul>



Challenge Category	Steering Committee/CAC Feedback	Focus Group Feedback
Equitable Economic Development	<ul style="list-style-type: none"> <li>❖ Gardner’s Basin and Delta Basin - leverage two Offshore Wind Operation and Maintenance Centers and Wind Training School with research and development facilities, corporate offices for wind related companies, international conferences, and workforce development efforts.</li> <li>❖ Development of a Resiliency and WIND Institute.</li> <li>❖ Blue Economy expansion in Atlantic City.</li> <li>❖ Dredge Management Plan - Restoration using dredge material. Multi-benefits: including wetland restoration and elevation of development sites. Bader Field, Shelter Island, Gateway site in Pleasantville.</li> </ul>	<ul style="list-style-type: none"> <li>❖ See comments for Regional Actions.</li> </ul>

The Preferred Scenario moves toward resilience in the vision, capacity, health and population, and socioeconomic indicator categories. Similar to Scenario 3, the Preferred Scenario includes nature-based adaptation solutions, and as such, it scores well and achieves resilience in the adaptation/timeframe and environmental indicator categories. Adopting a combination of gray infrastructure strategies and nature-based adaptation solutions would reduce risk and provide a high level of protection to the region overall including critical assets. In addition, because the Preferred Scenario takes a diverse approach to implementation, relying on federal, state, local, non-profit, and private sector partnerships and leveraging private investment to help finance needed resilience improvements, identifying financial assistance measures at the municipality level could be achieved. See **Figure 3-2** for a graphic representation of the evaluation tool results for the Preferred Scenario.

The section below describes the actions chosen for the Preferred Scenario in greater detail, organized by each of the seven challenges facing the region.

*Figure 3-2. Evaluation Tool Results for Preferred Scenario*

Resilience Indicator	Ranking
<i>Vision</i>	1
<i>Risk</i>	2
<i>Cost</i>	1
<i>Capacity</i>	1
<i>Environmental</i>	2
<i>Adaptation/ Timeframe</i>	2
<i>Health and Population</i>	1
<i>Socioeconomic</i>	1
<b>Scenario Ranking</b>	<b>1</b>



## 4 ACTION NARRATIVES

### 4.1 Shoreline Protection

The ACCR Action Plan includes a set of actions to protect the region from the flooding events defined in the Asset Collection and Risk Assessment Report in **Appendix C** and to prevent the devastation of the shoreline and inner neighborhoods. These actions offer different sets of solutions, some of which use engineering methods for protection from superstorm events, while a few of the other actions use longer term and nature-based solutions to increase the protection from threats caused by SLR over the decades for the region in medium to long-term time frame.

#### **Living Bay Master Plan**

The Living Bay Master Plan is a Future Analysis and Regulatory action. It provides a framework to establish condition monitoring for inundation, erosion, and loss; creates a tool to help to streamline permit reviews for resilience projects and prioritizes future restoration projects in the ACCR Back Bay tidal wetland areas. See **Figure 4-1**.

#### *Problem/Background Issues*

The ACCR Back Bay tidal marshes are critical in mitigating the impacts of storm surges on the communities and properties located along the bay shoreline. These tidal marshes will be subject to prolonged inundations, erosion, and loss due to SLR, resulting in the loss of vital ecosystem services that protect the surrounding communities and infrastructure from storm damage due to storm surges. As the frequency and severity of coastal storm events increase, the necessity of maintaining the ecological health of the bay will only grow in importance. This will require sustained, comprehensive, and coordinated planning to guide future development along shoreline properties, and improve and monitor water quality, wetlands, and wildlife habitat in the ACCR back bays, as well as sustained and securely funded intervention.

#### *Solution*

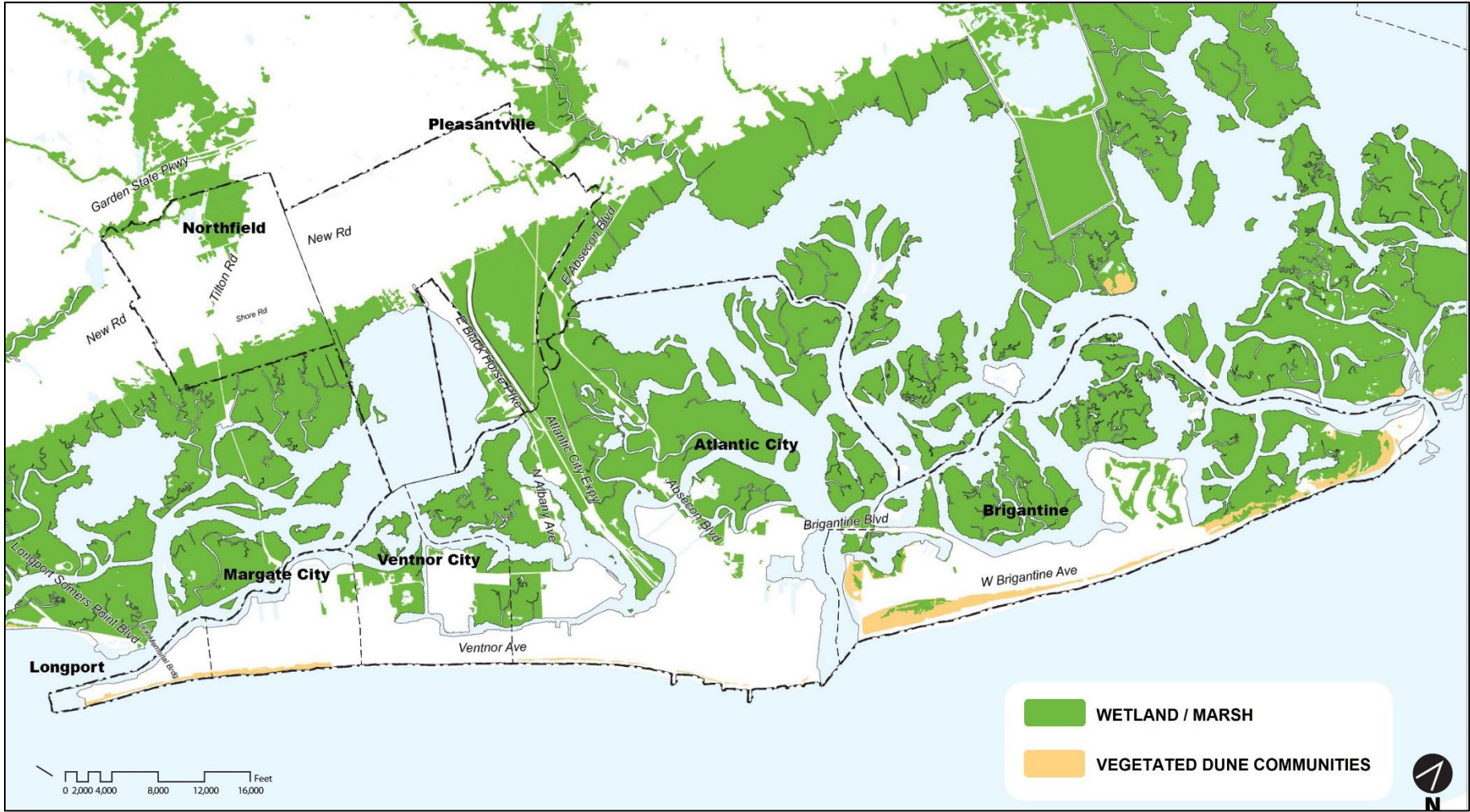
This action comprises a comprehensive and coordinated plan to guide future development along shoreline properties and improve and monitor water quality, wetlands, and wildlife habitat in the ACCR back bays.

The plan would create a framework to establish frequent condition monitoring, prioritize actions to restore habitats through thin-layer sand deposition in targeted locations and living shoreline improvements, and coordinate uses of resources (dredge sand) and funding.

#### *Flood Protection, Safety, and Risk Reduction*

This action would result in long-term reduction in losses from storm surge events region-wide. The action would help protect approximately 33,668 structures in the ACCR from storm surge. In addition, the action would also protect top critical assets in the ACCR, including high-medium risk facilities along the bayside, such as two Atlantic City radio towers, Pleasantville Clematic Avenue Park, Northfield Stillwater and Glencove Parks, and lodging along Black Horse Pike.

Figure 4-1. ACCR Back Bay Tidal Wetland and Marsh Areas



### *Connection to Resilience*

The Living Bay Master Plan would enhance the resilience of the region with a short-term implementation plan. This action would fulfill an environmental/ecological component of the ACCR Action Plan.

### *Co-Benefits*

This action is beneficial for the region because it would enhance ecosystem services of the Back Bay tidal wetlands and bring flood protection along the bayside—an area that the ACCR Steering Committee has identified as a key vulnerability.

### *Potential Funding and Finance Opportunities*

The Resilient NJ Program includes an implementation phase where the ACCR Steering Committee would select actions to advance toward implementation. As part of the Living Bay Master Plan, the ACCR Steering Committee recognized that local communities would benefit from a holistic assessment to prioritize locations for investments in living shoreline and tidal marsh restoration/enhancement projects. Previous planning efforts are informative; however, they do not assess all local shoreline segments to clearly identify specific project boundaries. As a result, the Resilient NJ Program is funding a geospatial analysis of restoration opportunities in the Back Bay area to complement the Living Bay Master Plan. This planning exercise will provide a prioritized list of the most appropriate areas for future living shoreline projects within the ACCR, as well as high-level recommendations for use of dredged materials in restoring dredge holes and eroding marshes. Information from environmental, social, and infrastructure data sets pertaining to coastal resilience and ecosystem services will be combined to determine the results of this analysis.

The organizations listed below are considered as potential partners and funding sources for future development phases of the Living Bay Master Plan:

- ❖ The Trust for Public Land
- ❖ The Nature Conservancy
- ❖ National Fish and Wildlife Foundation (NFWF) - National Coastal Resilience Fund
- ❖ National Oceanic and Atmospheric Administration (NOAA) - Coastal Resilience Grants for Coastal Communities
- ❖ FEMA - Hazard Mitigation Grant Program (HMGP) – Flood Protection
- ❖ NFWF, Wells Fargo - Resilient Communities Program - Natural ecosystems, Green Infrastructure
- ❖ NFWF - Adaptation through Regional Conservation Projects - SLR, interconnectedness of natural systems
- ❖ NFWF, the Wildlife Habitat Council (WHC), and the U.S. Environmental Protection Agency (EPA) - The Five Star and Urban Waters Program - Improve stewardship of natural lands, improve water quality and quantity
- ❖ USACE and NFWF - Dredging and Placement Demonstration Projects
- ❖ ACE - Sustainable Communities Grant Program - protect and improve public spaces such as local parks, natural areas, and recreation resources

### *Entity with Jurisdiction Over the Action*

The Living Bay Master Plan could be led by a number of different entities, such as The Nature Conservancy, Stockton University, or Rutgers University. This effort should be developed in partnership with local municipalities, as well as:

- ❖ Atlantic County
- ❖ Power Utilities
- ❖ The Nature Conservancy and other non-profits that are relevant
- ❖ New Jersey Department of Transportation (NJDOT) - Office of Maritime Resources
- ❖ NJDEP -Bureau of Coastal Engineering
- ❖ NJDEP – Department of Land Resource Protection

#### *Environmental Considerations*

This plan is not predicted to create any negative impact on the environment; it would create environmental benefits by improving the living shoreline ecosystem because additional protection would nurture the ecosystem services in Reeds Bay, Absecon Bay, and Lakes Bay east of Absecon Island (approximately 60 square miles).

#### *Local, State, Federal Regulatory Requirements*

This action could be implemented by utilizing the recreation planning and environmental conservation planning mechanisms within the leading and supporting organizations.

#### *Impact/Benefits to Socially Vulnerable Populations*

This action would provide protection from storm surge and tidal erosion for all ACCR populations, including low-income residents, LEP individuals, people with disabilities, seniors, and youth. Atlantic City and Pleasantville are both majority-minority populations with 40 percent and 23 percent of the population, respectively, living below the poverty line. Because an extreme weather event may exacerbate financial insecurity for these residents, protection from storm surge during large events would reduce the potential for lost wages and other financial hardships for low-income residents. Protection from storm surge and the associated health and safety impacts would benefit LEP individuals, primarily located in Atlantic City, Pleasantville, and Ventnor, whose language barriers may prohibit them from obtaining evacuation information. Protection from storm surge would also benefit people with disabilities throughout the ACCR by reducing the potential need for evacuations and interruption to medical care and social and support services. Seniors, primarily located in Longport, Margate, Brigantine, and Atlantic City, who face challenges related to health, transportation, and communication would also benefit from reducing the potential need for evacuations and interruption to medical care. Given the long-term protection from storm surge for the entire ACCR, the region's youth population would benefit from reduced storm impacts for decades into the future.

#### *Indication of Public Support*

There is general acceptance and enthusiasm for this proposal, recognizing that there are various plans that have been done but this one focuses on a comprehensive master plan for the ACCR's back bays.

The next step is to focus on funding opportunities and developing a project scope.

#### *Project Cost Estimate*

The estimated cost for this action is:

- ❖ \$\$\$ = Greater than \$250,000 but less than \$1 million

The Resilient NJ Program is funding a geospatial analysis of restoration opportunities in the Back Bay area that will complement the Living Bay Master Plan. Additional funding and partners will need to be identified for future development phases of the Living Bay Master Plan.



### *Implementation Timeline*

The Living Bay Master Plan is a short-term action with an estimated timeline for project implementation of 1 to 3 years. The action is estimated to start between 2025 and 2030.

### **Absecon Baykeeper**

Absecon Baykeeper is a Communication and Outreach action that could help build capacity among the region's civic groups with improved community involvement and stewardship. For this action, the plan proposes to establish a new non-profit organization, the Absecon Baykeeper, focused on stewardship of Absecon Bay. The scope of the non-profit organization could also be expanded to include other back bays in the region such as Reeds Bay and Lakes Bay. This action is aimed at bolstering the connection between the ACCR communities and the environmental systems. The action aims to strengthen the agency, awareness, and community voice across all of the ACCR's municipalities and advocate for initiatives spanning municipal boundaries that address the ecological and environmental health of the ACCR's most important natural resource.

### *Problem/Background Issues*

The ACCR back bays are the one element that touches on each municipality in the ACCR. The environmental health of Absecon Bay plays a central role in resilience of all the communities along its shoreline as well as the upland areas. Experiences elsewhere in the state and the United States have shown that awareness and education about the role such regional natural resources play is important in building a constituency for their continued maintenance and improvement. Organizations and activities oriented around building awareness and environmental education can also be a capacity-building tool and build civic pride.

### *Solution*

Absecon Baykeeper would carry out the mission through a combination of (1) formal and non-formal environmental education programs designed to raise awareness of the residents and visitors to the region, and (2) work to protect, preserve, and restore the various fish and wildlife habitats that exist in the watershed. Absecon Baykeeper would act as a steward for the bay by promoting responsible, sustainable development. It would also work to promote volunteerism (e.g., bay cleanup days, etc.) and increase public awareness about the importance of the bay to the resilience of the region through tours, lectures, and literature. As a part of stewardship, the organization could serve as a resource to assist local, state, and federal agencies to identify threats to the resilience of the bay and the abutting communities and to promote advocacy for comprehensive planning to guide the future of Absecon Bay.

### *Flood Protection, Safety, and Risk Reduction*

Public awareness would build a constituency for the maintenance and improvement of the environmental health of Absecon Bay. The overall ecological area protected with this action, approximately 60 square miles of land in the region, would include Reeds Bay, Absecon Bay, and Lakes Bay east of Absecon Island. Environmental advocacy and stewardship established by Absecon Baykeeper would indirectly help protect about 200 critical assets across the region. Specifically, this projection would extend to high-medium risk facilities along the bayside, including two Atlantic City radio towers, Pleasantville Clematic Avenue Park, Northfield Stillwater and Glencove Parks, and lodging along Black Horse Pike.

This action would enhance protection for all populations in the region and could positively impact Atlantic City and Pleasantville where SVPs are concentrated.

### *Connection to Resilience*

The Absecon Baykeeper would support environmental protection as well as community outreach components by building capacity and partnerships within communities through education, advocacy, and stewardship.

### *Co-Benefits*

Absecon Baykeeper is one of the Supporting Actions that would address Shoreline Protection. More specifically, it would directly support the Living Bay Master Plan, which is a region-wide and Keystone Action. This action is expected to enhance ecosystem services of the Back Bay tidal wetlands and benefit flood protection along the bayside.

### *Potential Funding and Finance Opportunities*

Currently, no funding has been secured for the implementation of this action; however, the organizations and their programs listed below could potentially financially support this action's capacity-building efforts:

- ❖ NFWF - National Coastal Resilience Fund
- ❖ FEMA - Building Resilient Infrastructure and Communities (BRIC)
- ❖ FEMA - HMGP - Public Education and Outreach
- ❖ NFWF - Community Capacity Building and Demonstration Projects - advance social cohesion, green infrastructure
- ❖ Threshold Foundation - Thriving Resilient Communities Funding Circle - strengthening local and regional resilience in climate, economy, justice, and collaborative networks

### *Entity with Jurisdiction Over the Action*

The environmental advocacy, education, and stewardship activities proposed for the Absecon Baykeeper would be led by the organization itself. The organization could be supported by NJDEP and other non-profits such as the Trust of the Public Land and The Nature Conservancy.

### *Environmental Considerations*

This action would increase awareness for environmental protection and ecosystem-based solutions for climate change adaptation.

### *Local, State, Federal Regulatory Requirements*

This action could be implemented using the recreation planning and environmental conservation planning mechanisms within the Absecon Baykeeper organization itself as well as within the supporting organizations. A sustained funding source is a requirement for this action to be implemented.

### *Impact/Benefits to Socially Vulnerable Populations*

This action would enhance protection for all ACCR populations by bolstering the connection between the ACCR communities and the environmental systems and advocating for initiatives that address the ecological health of the back bays. This Communication and Outreach action has the potential to benefit low-income residents, LEP individuals, people with disabilities, seniors, and youth by strengthening the agency, awareness, and community voice across all of the ACCR's municipalities. Communication and Outreach actions are especially important in building awareness of the importance of environmental systems among LEP individuals, primarily located in Atlantic City, Pleasantville, and

Ventnor, who may experience language barriers, and seniors primarily located in Longport, Margate, Brigantine, and Atlantic City, who may experience communication challenges and have limited awareness of resilience actions.

#### *Indication of Public Support*

Other organizations with similar purviews exist in the region such as the Great Egg Harbor Watershed Association and Friends Along the Mullica; however, none of them are exclusively focused on Absecon Bay. Therefore, communication and partnerships with those existing organizations is important so Absecon Baykeeper could benefit by learning from those organizations as it occupies its unique role and niche in environmental stewardship.

#### *Project Cost Estimate*

Project cost for this item involves an upfront cost needed to form a non-profit organization. Additionally, annual operating costs for this organization needs to be estimated.

The preliminary annual operating estimate for this organization is:

❖ \$\$\$ = Greater than \$250,000 but less than \$1 million

#### *Implementation Timeline*

The Absecon Baykeeper is a short-term action with an estimated timeline for project implementation of 1 to 3 years. The action is estimated to start between 2025 and 2030.

### **USACE New Jersey Back Bays Plan**

This action item is a capital improvement project that constitutes USACE operations to protect the bayside from storm surge events. This action is a separate, ongoing, project, currently in the preliminary planning stage, that seeks to provide strategies to reduce risk from future storms and impacts of sea level change for the New Jersey Back Bays region. The project study area spans five New Jersey counties: Cape May, Ocean, Atlantic, Monmouth, and Burlington. The ACCR recognizes the ongoing effective partnership with the USACE through municipal resolutions and will continue to engage with the USACE as a partner in the region and consider the USACE New Jersey Back Bays Plan. However, overall public support for the USACE New Jersey Back Bays Plan is unknown at this time.

If implemented, a portion of the proposed USACE New Jersey Back Bays capital improvement projects would be located in the ACCR. In Atlantic City, the USACE operations would involve construction of a cross-bay barrier that would be a continuous floodwall along the entire length of Absecon Boulevard, tying to the existing Absecon seawall at the inlet. At the inlet south of Longport, operations would include the construction of the Great Egg Harbor Inlet Storm Surge Barrier. In Brigantine, the USACE would elevate the houses and complete hardening on the Brigantine bayside along Brigantine and Bayshore Avenues. Non-structural solutions in the Action Plan include elevation and flood proofing of residential structures.

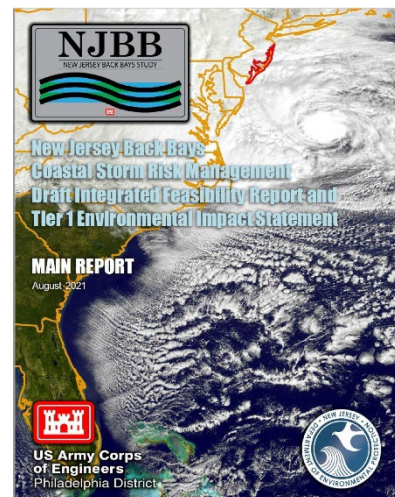


Image: USACE Draft New Jersey Back Bays Coastal Storm Risk Management Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement

### *Problem/Background Issues*

The New Jersey Back Bays have been the subject of study by the USACE. In 2021, the USACE released the draft New Jersey Back Bays Coastal Storm Risk Management Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement (Draft Integrated Report). While the Atlantic Ocean coast of New Jersey is protected by a federal coastal storm risk management program that includes beach nourishment and dune construction, the New Jersey Back Bays region does not currently have a comprehensive coastal storm risk management program to protect barrier island communities on the bayside or mainland Back Bay communities. The Draft Integrated Report, which is subject to change, outlines a tentatively selected plan framework to address potential devastation that might occur due to a storm surge flooding event triggered by superstorm events and aims to prevent this devastation by providing engineered solutions against flooding. The plan, which would be implemented by the USACE, has not been funded for implementation at the federal or state level and assumes matching funds contributed by local municipalities and the state.

### *Solution*

The USACE operations would protect the region on the bayside to varying degrees. For example, the Atlantic City cross-bay barrier (floodwall) and Great Egg Harbor Inlet Storm Surge Barrier could reduce storm surge flooding and critical infrastructure and evacuation route exposure to damage on Absecon Island communities; however, the infrastructure and evacuation routes would remain vulnerable on the mainland communities of Pleasantville and Northfield and the barrier island of Brigantine. Overall this action item would protect, to varying degrees, top critical assets in the ACCR, including approximately 200 assets and 33,668 structures. The flooding event from the bayside that is triggered by a superstorm event is expected to impact all the ACCR populations; therefore, the USACE's solutions (structural and non-structural) would protect a wide range of populations in the entire region, including the SVPs who are concentrated in Atlantic City and Pleasantville.

Despite being led by a federal organization, this action item should be enacted in coordination with local organizations and in concert with their municipal resolutions so that USACE can be supported as a partner.

While this action is being implemented, USACE's operations proposed within this action (structural and non-structural) should consider that interior flooding from heavy precipitation events will still occur; however, future capital improvement projects, such as additional flood pumps, will help drain the interior flooding water to a certain extent.

### *Flood Protection, Safety, and Risk Reduction*

The USACE New Jersey Back Bays Plan would offer protection against bayside flooding caused by a Superstorm Sandy type of event (Federal Emergency Management Agency [FEMA] 0.2 percent annual exceedance probability [500-year recurrence interval] flood) Losses that this action item would help avoid total approximately \$3 billion, which is comparable to losses from Superstorm Sandy in 2012. In particular, this action may prevent approximately 80 to 90 percent of the estimated \$800 million losses on Absecon Island and may prevent some of approximately \$6 million losses in Brigantine (according to Hazus analysis in the Draft Integrated Report).<sup>2</sup> In comparison, the four Resilient NJ future flood conditions, as explained in **Appendix C**, include the increase in SLR alone; SLR plus two storm

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<sup>2</sup> USACE-Philadelphia District. 2021. New Jersey Back Bays Coastal Storm Risk Management Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement. Main Report. August.

scenarios, the 1 percent annual chance, 24-hour storm event and the 2 percent annual, 2-hour storm event; and SLR plus the storm surge that occurred from Superstorm Sandy.

#### *Connection to Resilience*

This action item would support resilience efforts in the region by providing clear-cut protection to the region from flooding, albeit as a relatively short-term solution because storm surge barriers would protect communities from storm surge flooding during large events but would not address the issues of SLR in the region. This action item would reduce losses and potential hazards from sudden flooding surges; and thus, it would bring relief to the physical environment while other medium- to long-term resilience plans are implemented.

#### *Co-Benefits*

This project would provide a significant benefit for flood protection along the bayside and consequently reduce risk for inland flooding; it would also reduce reliance on the stormwater management actions planned for inner neighborhoods.

#### *Potential Funding and Finance Opportunities*

There is no funding currently available. Potentially, the federal government would cover 65 percent of the needed funding. A state/local match would be required for the remaining 35 percent, plus annual maintenance. This 35 percent local cost share could potentially remain as a funding gap.

#### *Entity with Jurisdiction Over the Action*

The USACE (a federal agency) would implement this action. The USACE's action would be supported by NJDEP and local municipalities (local match and cooperation needed).

#### *Environmental Considerations*

The Draft Integrated Report identified a number of the structural alternatives, such as the storm surge barriers and the cross-bay barriers, as environmentally “high risk” based on “uncertainties of indirect impacts on aquatic ecosystems, high direct impacts, potentially extensive compensatory mitigation, and complex regulatory reviews.” The storm surge barriers and the cross-bay barriers are expected to have direct impacts on aquatic habitats. The Draft Integrated Report also referenced ongoing consideration of large and small-scale natural and nature-based features for regional climate change and sea level change strategies. The USACE is conducting additional analyses in this regard. As discussed at ACCR Steering Committee meetings, engineered structural solutions should not be detrimental to long-term and nature-based resilience solutions.

#### *Local, State, Federal Regulatory Requirements*

Potential obstacles to this action are the need for 35 percent of the costs to be funded by state and local organizations. This level of cost-share funding is currently not available, and it is not known which of the state and local organizations could provide it.

#### *Impact/Benefits to Socially Vulnerable Populations*

The USACE New Jersey Back Bays Plan action item aims to protect all populations across the ACCR from bayside flooding caused by a Superstorm Sandy type of event. This protection includes low-income residents, LEP individuals, people with disabilities, seniors, and youth. Atlantic City and Pleasantville are both majority-minority populations with 40 percent and 23 percent of the population, respectively,



living below the poverty line. Because an extreme weather event may exacerbate financial insecurity for these residents, protection from storm surge during large events would reduce the potential for lost wages and other financial hardships for low-income residents. Protection from storm surge and the associated health and safety impacts would benefit LEP individuals, primarily located in Atlantic City, Pleasantville, and Ventnor, whose language barriers may prohibit them from obtaining evacuation information. Protection from storm surge would also benefit people with disabilities throughout the ACCR by reducing the potential need for evacuations and interruption to medical care and social and support services. Seniors, primarily located in Longport, Margate, Brigantine, and Atlantic City, who face challenges related to health, transportation, and communication would also benefit from reducing the potential need for evacuations and interruption to medical care. Given the long-term protection from storm surge for the entire ACCR, the region's youth population would benefit from reduced storm impacts for decades into the future.

#### *Indication of Public Support*

The ACCR recognizes the ongoing effective partnership with the USACE through municipal resolutions and will continue to consider the USACE New Jersey Back Bays Plan. Public support for the USACE New Jersey Back Bays Plan is unknown at this time.

#### *Project Cost Estimate*

The cost estimate for the implementation of the USACE New Jersey Back Bays Plan is:

❖ \$\$\$\$\$= Greater than \$10 million

The entire cost for the USACE New Jersey Back Bays plan, which spans five New Jersey counties, is \$16 billion. Annual maintenance cost for the entire plan is estimated to be \$192 million. In the ACCR, non-structural solutions, the Great Egg Harbor Inlet Storm Surge Barrier, and the Absecon Boulevard Cross-Bay Barrier are estimated to cost approximately \$6.2 billion for construction and \$107 million for annual maintenance (Draft Integrated Report).

#### *Implementation Timeline*

This action item is estimated to start no earlier than 2030, and the project duration is planned to be 5 years. The total lifespan of the action is estimated to be 50 years, to 2085 if the project is started in 2030. These timeline estimations are indicated in the Draft Integrated Report.

### **USACE Install Sheet Pile Dune Core**

This action item is a Flood Mitigation Project that involves installing a sheet pile dune core in Atlantic City as a reinforcement to the existing dune from Jackson to Absecon Inlet and installing a sheet pile dune core at the northern half of Brigantine.

Sheet piles could benefit the entire Absecon Island and Brigantine Island dune system, but the Downbeach communities expressed concern about dune heights blocking views. The goal of dune sheet piles is to protect near-shore properties from repeated storm events where the initial storm damages the dune protection and there is insufficient time for repairs before a subsequent event. Sheet piles can also provide dune stability for future dune elevation in response to future SLR and future erosional storms. The potential to add sheet pile stabilization for the Absecon Island and Brigantine Island dune system should be explored via a feasibility study that includes local input.

### *Problem/Background Issues*

Beach erosion has been an ongoing issue for Absecon Island's four municipalities and for Brigantine. To address the ongoing erosion, which threatens the buildings located on the ocean-side and the beach itself, the USACE has been working with all five municipalities for over 20 years to nourish the beaches through a beach replenishment program. The USACE has installed sheet pile dune cores in Mantoloking, New Jersey, to reinforce existing dunes against wave action and beach erosion..

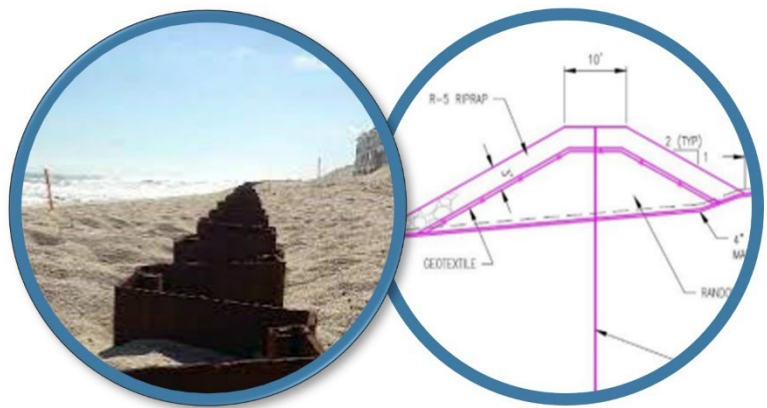


Image: Sheet Pile Dune Core

### *Solution*

The Action Plan addresses the potential vulnerability of shoreline for inundation after dunes are eroded during a superstorm or SLR event. Installing a sheet pile dune core would provide ocean-side protection against dune erosion from wave action and beach erosion and help the dunes to be more resistant to repeated erosional events, especially when the time between an initial event and near-term subsequent event does not allow sufficient time for dune repair and restoration.

For a successful implementation and long-lasting positive impact, the sheet pile dunes should be maintained through scheduled nourishment cycles. If the nourishment is insufficient for the repeated storm events, the dunes may erode before the scheduled nourishment and the sheet pile wall may be exposed. The nourishment cycles must be updated in accordance with changes in storm event frequency and intensity.

### *Flood Protection, Safety, and Risk Reduction*

The action to Install Sheet Pile Dune Core aims to protect shoreline from SLR anticipated in next 50 years (SLR in 2070). It would reinforce the existing protection that dunes provide because the sheet pile dune core is more resistant to repeating erosional events. The action would enhance protection for approximately 13,467 structures, as well as for critical facilities located in Atlantic City and Brigantine. The protection would cover residents, workers, visitors, and SVPs concentrated in the city. The action to Install Sheet Pile Dune Core would protect approximately 70 high-medium critical facilities in Atlantic City and approximately 11 high-medium critical facilities in Brigantine.

### *Connection to Resilience*

The action to Install Sheet Pile Sand Dune Core is central to resilience because it would protect the shoreline from a potentially devastating effect of superstorms and SLR, and this level protection would have an effect on the 13-mile ecological area and the communities along the shore.

### *Co-Benefits*

This action would reinforce the existing protection of dunes and help the shoreline be more resistant to losses from repeated storm events, especially in concert with the ongoing Beach Nourishment Program.

### *Potential Funding and Finance Opportunities*

Currently there is no funding secured for this action item; however, funding may be found in the following programs that have objectives related to shoreline protection:

- ❖ NFWF - National Coastal Resilience Fund
- ❖ NOAA - Coastal Resilience Grants for Coastal Communities
- ❖ FEMA - HMGP – Flood Protection
- ❖ NJDEP – Shore Protection Program, funding projects protecting from coastal storm damage, erosion and shoreline migration, and SLR
- ❖ NFWF, Wells Fargo - Resilient Communities Program - natural ecosystems, green infrastructure, SLR
- ❖ NFWF - Adaptation through Regional Conservation Projects - SLR, interconnectedness of natural systems
- ❖ NFWF, WHC, EPA - The Five Star and Urban Waters Program - improve stewardship of natural lands, improve water quality and quantity
- ❖ USACE and NFWF - Dredging and Placement Demonstration Projects
- ❖ USACE - Continuing Authorities Program
- ❖ ACE - Sustainable Communities Grant Program - protect, and improve public spaces such as local parks, natural areas, and recreation resources

### *Entity with Jurisdiction Over the Action*

USACE would lead the Installation of Sheet Pile Sand Dune Core with additional support from NJDEP.

### *Environmental Considerations*

This action would provide protection for approximately 13 miles of oceanfront shoreline and help sustain the shoreline habitat.

### *Local, State, Federal Regulatory Requirements*

State and federal regulatory compliance would be required through NJDEP and the USACE.

### *Impact/Benefits to Socially Vulnerable Populations*

This action has the potential to reinforce ocean-side protection against dune erosion from wave action and beach erosion in Atlantic City and Brigantine. Atlantic City is a majority-minority population with 40 percent of the population living below the poverty line. Because an extreme weather event may exacerbate financial insecurity for these residents, protection from inundation after dunes are eroded during a superstorm or SLR event would reduce the potential for lost wages and other financial hardships for low-income residents. Protection from inundation and the associated health and safety impacts would benefit LEP individuals located in Atlantic City, whose language barriers may prohibit them from obtaining evacuation information. Seniors located in Brigantine and Atlantic City, who face challenges related to health, transportation, housing, and communication would also benefit from reducing the potential need for relocation due to SLR, evacuations during storm events, and interruption to medical care. Protection from inundation after dune erosion would also benefit people

with disabilities in Atlantic City and Brigantine by reducing the potential need for evacuations and interruption to medical care and social and support services. Given the long-term protection on the ocean-side, the region's youth population would benefit from reduced SLR and storm impacts for decades into the future.

#### *Indication of Public Support*

Similar sheet pile dune core projects have been successfully completed in the Borough of Mantoloking and Sandy Hook. No specific public objections were raised during the ACCR Resilient NJ Action Plan development; however, the ACCR Steering Committee has recommended focusing on the ongoing beach nourishment action and revisiting the Install Sheet Pile Dune Core action if needed in the future.

#### *Project Cost Estimate*

The estimated cost for this action is:

❖ \$\$\$\$\$= Greater than \$10 million

Based on the Mantoloking Sheet Pile Dune Restoration Project, the cost estimated for installation of sheet pile dune core is approximately \$23.84 million per 3.5 miles. More detailed estimates could occur in the context of a feasibility study, but if all 13 miles were improved, the cost could range up to approximately \$100 million. The investment could be part of a larger USACE beach fill project.

Additional costs are associated with renourishment cycles; nourishment needs to be done regularly before dune erosion occurs, otherwise nourishment prices may increase because additional effort would be required to work around the wall. See the Beach Nourishment Program action for more information on federal/state/local cost-share information.

#### *Implementation Timeline*

This is a short-term action estimated to start sometime between 2025 and 2030. Implementation of this project would take 1 to 3 years, and the impact of this action is expected to last for 75 years.

### **Beach Nourishment Program (by USACE and NJDEP Partnership)**

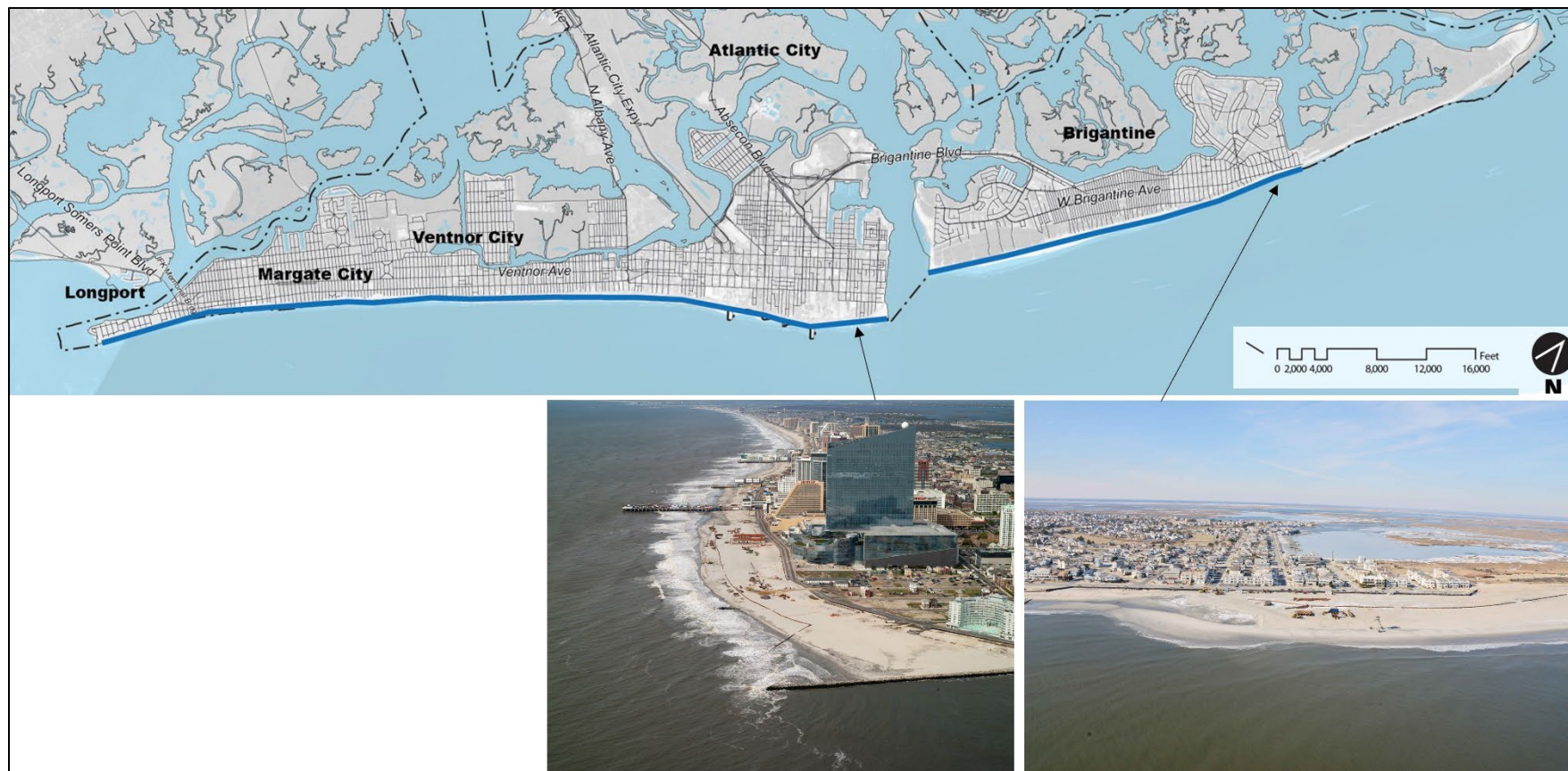
This action item is a Flood Mitigation Project that would bring ocean-side flood protection to Atlantic City, Brigantine, and Downbeach. The action involves gradual and incremental elevation of the dune and berm heights through nourishment cycles to address anticipated SLR in future decades. See **Figure 4-2**.

#### *Problem/Background Issues*

To address the ongoing erosion, which threatens both the buildings located on the ocean-side and the beach itself, the USACE has been working with Absecon Island's four municipalities and Brigantine to nourish the beaches along the entire 13-mile length of Absecon Island and the length of Brigantine Beach.

Beach Nourishment action addresses shoreline losses (erosion) caused by SLR and storm surge (SLR 2070 + storm surge) to the shoreline. The action aims to maintain sea level losses at the current level and prevent further erosion, thus it primarily increases an ecosystem's capacity for adaptation to SLR.

Figure 4-2. Beach Nourishment Areas within the ACCR



Source: USACE Fact Sheet: New Jersey Shore Protection, Absecon and Brigantine Islands.



### *Solution*

This action would continue the existing Beach Nourishment Program with a gradual elevation increase to address the projected increased height of storm surge over time. The action would be implemented by incrementally raising the dune and berm heights through nourishment cycles that would require technical review by engineers to change the authorized design template. This process would involve modifying the template to pump feeder beaches or feeder dunes above or at erosion hot spots. NJDEP, the non-federal sponsor for this action, would initiate the request for this process.

This action primarily aims to assist in the protection of the Atlantic City, Brigantine, and Downbeach assets from wave action, inlet breaches, beach erosion, overwash, and related ocean-side flooding. Overall, this action would help protect residents, workers, visitors, and the SVPs concentrated in Atlantic City.

### *Flood Protection, Safety, and Risk Reduction*

Specifically, the beach nourishment action would target protection from threats brought by SLR and storm surge events (SLR 2070 + storm surge) to the shoreline. The current USACE Beach Nourishment Program for Absecon Island includes a dune to elevation 14.75 feet for Atlantic City and 12.75 for the Downbeach communities of Ventnor, Margate, and Longport.<sup>3</sup> Potential threats are erosion and inundation in the shoreline and subsequent erosional losses along the shoreline and related natural habitats. The existing Beach Nourishment Program has helped address shoreline losses caused by SLR and storm surge to the shoreline. Continued implementation of the Beach Nourishment Program, in concert with dune maintenance and restoration, would improve resilience against wave action, storm surge, and other flood impacts along Absecon and Brigantine Islands. It would contribute somewhat to improved resilience for critical assets within Atlantic City, Brigantine, and in the Downbeach area, but most importantly, it would protect one of the highest value economic draws in the ACCR region—that of the world-famous beachfront.

### *Connection to Resilience*

Beach Nourishment is a Keystone Action of the ACCR Action Plan because it provides a nature-based protection mechanism for the shoreline, which increases the ecosystem's capacity for adaptation to gradual sea level change predicted for the next decades. Because it aims to maintain and nourish the habitat while preventing further losses, beach nourishment would have lasting benefits to the ACCR. These benefits would make the region less reliant on drastic and costly actions. Because the action would generate ecological, social, and economic benefits, creating a win-win situation for the region, a Beach Nourishment Program is central to resilience plans for the ACCR.

### *Co-Benefits*

Benefits of this action for the communities are not immediately visible, other than enhanced protection for near-shore populations and property from wave action, SLR, and storm surge events. This action would act in concert with the installation of sheet pile dune cores to help the shoreline be more resistant to losses from repeated storm events. Other social benefits would include the

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<sup>3</sup> USACE Philadelphia District. 2021. New Jersey Shore Protection, Brigantine Inlet to Great Egg Harbor Inlet, Absecon Island Factsheet. Available at <https://www.nap.usace.army.mil/Missions/Factsheets/Fact-Sheet-Article-View/Article/490776/new-jersey-shore-protection-brigantine-inlet-to-great-egg-harbor-inlet-absecon/>

tremendously valuable ecotourism and educational and recreational benefits, which may have a strong positive economic impact on the region and are part of the basis of its attraction.

#### *Potential Funding and Finance Opportunities*

Currently funding for the Beach Nourishment Program partially comes from the federal government. For federal beach fill projects, the federal government contributes 65 percent of the project cost, while the remaining 35 percent is divided into a cost share, with the state contributing 75 percent and the local governments contributing the remaining 25 percent. Non-federal beach fill projects are funded through a state/local cost share, with the state contributing 75 percent and the local governments contributing 25 percent. All funding is provided through the NJDEP Division of Coastal Engineering's Shore Protection Fund.

Local municipalities and other government jurisdictions would share the cost of the action during implementation.

#### *Entity with Jurisdiction Over the Action*

NJDEP with the support from local municipalities and the USACE would lead the Beach Nourishment Program.

#### *Environmental Considerations*

The Beach Nourishment Program would have a positive impact on the environment. In the long term, it would help restore ecosystem services in the region such as improved water quality and filtration of water through the sand and wildlife habitat and biodiversity. Overall, the program would bring 13 miles of shoreline protection for the region's ecology.

One of the environmental obstacles to be considered for successful implementation of the program is that existing dune vegetation on the Atlantic City shoreline interrupts ocean views. This impact could be resolved by replacing tall grasses with lower grasses of equal stability function over time.

#### *Local, State, Federal Regulatory Requirements*

State and federal regulatory compliance would be required through NJDEP and the USACE.

#### *Impact/Benefits to Socially Vulnerable Populations*

This action primarily aims to protect Atlantic City, Brigantine, and Downbeach from storm damage. Atlantic City is a majority-minority population with 40 percent of the population living below the poverty line. Because an extreme weather event may exacerbate financial insecurity for these residents, protection from storm damage would reduce the potential for lost wages and other financial hardships for low-income residents. Protection from storm surge and the associated health and safety impacts would benefit LEP individuals, primarily located in Atlantic City and Ventnor, whose language barriers may prohibit them from obtaining evacuation information. Protection from storm surge would also benefit people with disabilities throughout Absecon and Brigantine Islands by reducing the potential need for evacuations and interruption to medical care and social and support services. Seniors, primarily located in Longport, Margate, Brigantine, and Atlantic City, who face challenges related to health, transportation, and communication would also benefit from reducing the potential need for evacuations and interruption to medical care. Given the long-term protection from storm surge and related flood impacts, the region's youth population would benefit from reduced storm impacts for decades into the future.

### *Indication of Public Support*

Through the successful implementation of the existing Beach Nourishment Program, the ACCR has sought positive public engagement, especially through formal public processes, including those conducted with the USACE.

### *Project Cost Estimate*

The estimated cost for this action is:

- ❖ \$\$\$\$\$= Greater than \$10 million

If implemented effectively, the action would be a cost-efficient solution that works in coordination with the dredge process that currently occurs every few years for regular beach nourishment.

Overall components of the program cost are as follows:

- ❖ Beach nourishment fill length: 6,000 linear feet
- ❖ Beach nourishment: 600,000 cubic yards (quantity from high estimate per linear foot); \$20/cubic yard (average unit cost)<sup>4</sup>
- ❖ Mobilize/Demobilize: \$6 million (high end)
- ❖ Estimated nourishment cost per 6,000 linear feet beach nourishment: \$18 million
- ❖ Maintenance cost needs to be estimated for 3-year cycles: not included

However, data from the USACE suggests lower overall volumes of replenishment for periodic nourishment of the approximately 10-mile-long beachfront. Additional estimates can be drawn from the USACE Beach Nourishment Program information provided in the New Jersey Shore Protection, Brigantine Inlet to Great Egg Harbor Inlet, Absecon Island Factsheet.<sup>5</sup>

### *Implementation Timeline*

The Beach Nourishment Program is an ongoing project, with an implementation cycle every 3 years. The impact of this program is a long term and ongoing.

The ACCR Steering Committee recommends further studies to determine the action/design elevation more specifically because it is uncertain to what extent the gradual elevation should increase per SLR, and where to stop the action if the increased dune elevation eventually affects the communities (e.g., ocean views).

### **Offshore Breakwaters Study (by USACE and Municipalities)**

This action is proposed as Storm Surge/Wave Action Mitigation and would enhance shoreline protection for Atlantic City, Downbeach, and Brigantine by implementing offshore breakwaters.

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<sup>4</sup> South Atlantic Coast Study (SACS) Measures & Cost Library Report. 2021. Available at SACS Measures and Cost Library Report (army.mil). Florida costs cited.

<sup>5</sup> USACE Philadelphia District. 2021. New Jersey Shore Protection, Brigantine Inlet to Great Egg Harbor Inlet, Absecon Island Factsheet. Available at <https://www.nap.usace.army.mil/Missions/Factsheets/Fact-Sheet-Article-View/Article/490776/new-jersey-shore-protection-brigantine-inlet-to-great-egg-harbor-inlet-absecon/>

### *Problem/Background Issues*

Coastal erosion in the ACCR has traditionally been addressed by beach nourishment with a goal of maintaining sea level losses at the current level and preventing further erosion. An alternative approach that could reduce the need for frequent beach nourishment by elevating the dune is to construct offshore breakwaters. Offshore breakwaters aim to reduce the effects of storm surge and coastal erosion by absorbing wave energy during storm events. By calming waters on the shoreward side of the breakwater, the offshore breakwaters reduce the direct impacts to the shoreline. In the long term, offshore breakwaters can reduce the amount of longshore drift, which prevents the transport and erosion of sediment along the shore. The action aims at maintaining sea level losses at the current level and preventing further erosion; thus, it primarily increases the ecosystem's capacity for adaptation to SLR (SLR 2070).

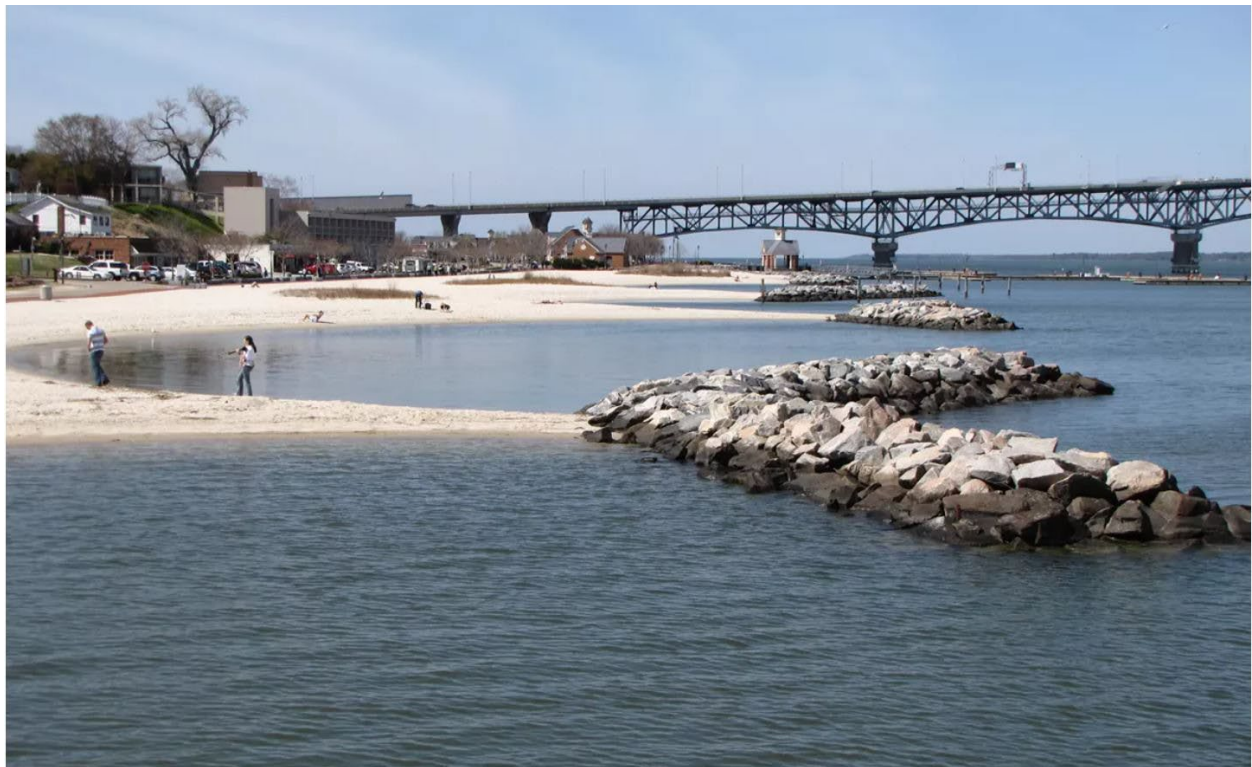


Image: A series of breakwaters promoting sediment accretion at Colonial National Historic Park, Virginia. Source: National Park Service Photo by Steve Simon, 2012

### *Solution*

Offshore Breakwaters would diminish wave energy that leads to beach erosion; they would be implemented to lessen the requirement for frequent cycles of beach nourishment and dune elevation, while the overall goal would be to carry out breakwaters, beach nourishment, and dune elevation in combination. Specifically, this action would enhance ocean shoreline erosion protection from threats brought primarily by SLR and storm surge events. Because conditions vary at each coastal location, no universal type of breakwater can be prescribed. As a result, the ACCR recommended conducting an Offshore Breakwaters Study for the region as a first step to identify breakwater options and project locations. The ACCR Steering Committee identified a jetty, groin, or similar erosion reducing structure for the north end of Brigantine. A groin is a wall-like structure built perpendicular to the shore to contain sand in areas of high erosion.

### *Flood Protection, Safety, and Risk Reduction*

Potential threats are erosion along the shoreline and subsequent losses in the shoreline habitat that would have negative effects on ecosystem services. This action primarily aims to protect the Atlantic City, Brigantine, and Downbeach shoreline from wave action and storm surge-induced erosion.. The ecological area protected by this action encompasses the oceanfront shoreline of Absecon Island and Brigantine Island.

This action would enhance protection of the shoreline for tourism and recreational users and reduce erosion potentially affecting near-shore critical assets in Atlantic City, Downbeach communities, and assets in Brigantine. Overall, this action would improve shore stability for residents, workers, visitors, and SVPs along near-shore Absecon Island and Brigantine Island locations and is especially important in protecting the tourist and recreational economy of the region.

### *Connection to Resilience*

This action would provide additional ocean-side protection and increase the ecosystem's capacity for adaptation to gradual sea level change predicted to occur in future decades.

### *Co-Benefits*

This action could reduce the need for frequent beach nourishment and enhance protection. Other social benefits could include helping to protect ecotourism and educational and recreational resources, which may have a positive economic impact on the region in the long term.

### *Potential Funding and Finance Opportunities*

Funding could potentially be available through shoreline protection programs from the following organizations:

- ❖ NFWF - National Coastal Resilience Fund
- ❖ NOAA - Coastal Resilience Grants for Coastal Communities
- ❖ FEMA - HMGP – flood protection
- ❖ NJDEP – Shore Protection Program, funding projects protecting from coastal storm damage, erosion and shoreline migration, and SLR
- ❖ NFWF, Wells Fargo - Resilient Communities Program - natural ecosystems, green infrastructure, SLR
- ❖ NFWF - Adaptation through Regional Conservation Projects - SLR, interconnectedness of natural systems
- ❖ NFWF, WHC, EPA - The Five Star and Urban Waters Program - Improve stewardship of natural lands, improve water quality and quantity
- ❖ USACE and NFWF - Dredging and Placement Demonstration Projects
- ❖ USACE - Continuing Authorities Program
- ❖ ACE - Sustainable Communities Grant Program - protect, and improve public spaces such as local parks, natural areas, and recreation resources
- ❖ Local governments will share the cost of action during implementation.

### *Entity with Jurisdiction Over the Action*

This program would be led by partnership formed between the USACE and the municipalities. Other organizations may support this action, as determined through the Offshore Breakwaters Study.



### *Environmental Considerations*

Living Breakwater options along with the traditional breakwater methods should be explored in the Offshore Breakwater Study to mitigate this action's long-term impact on the environment. In addition to environmental considerations, there are potential obstacles that require further consideration (e.g., groin notching would eliminate access to fishing on the groins). Offshore bathymetry could drop off quickly and make offshore breakwaters cost prohibitive. Offshore Breakwaters would not alleviate inundation risks; they would only reduce wave action that erodes dunes and leaves property exposed. Risks to boaters and swimmers should be considered during the design process.

### *Local, State, Federal Regulatory Requirements*

State and federal regulatory compliance would be required through NJDEP and the USACE.

### *Impact/Benefits to Socially Vulnerable Populations*

This action would improve shore stability for all ACCR populations along near-shore Absecon and Brigantine Island locations, including low-income residents, LEP individuals, people with disabilities, seniors, and youth. SVPs would benefit from reduced beach erosion from a recreational perspective and the overall protection of the regional tourist and recreational economy.

### *Indication of Public Support*

The public expressed interest in this action. Public support would be further gauged through the Offshore Breakwater Study. The ACCR Steering Committee voiced support for the offshore breakwaters concept with the recognition that further study is needed. The concept design for adding breakwaters along the ACCR study area is intended to allow for strategic placement to facilitate future surfing activity. The design would also need to consider safe boat navigation if the breakwaters are submerged. Design should occur in concert with relevant surfer coalitions, the local fishing industry, and local authorities.

### *Project Cost Estimate*

The estimated cost for this action is:

❖ \$\$\$\$\$= Greater than \$10 million

The cost would be highly dependent on the type of breakwater needed at each location, there is no universal type of breakwater can be prescribed due to wide variation.

The ACCR Steering Committee lists cost components for offshore breakwaters as the following:

- ❖ Breakwater length: 400 linear feet
- ❖ Mobilize/Demobilize: \$1.2 million (unit cost high)
- ❖ Armor Stone: \$/ton 7654 (quantity high), \$270 (unit cost high)
- ❖ Underlayer Core Stone: \$/ton 2868 (quantity high), \$270 (unit cost high)
- ❖ Marine Mattress: \$/square foot (SF) 45200 (quantity high), \$45 (unit cost high)<sup>6</sup>

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<sup>6</sup> Ibid.

### *Implementation Timeline*

This is a mid-term action, with 2030-2050 as the implementation timeline and a 3- to 5-year implementation timeframe. The total life span of the action is estimated to be 30 to 50 years, after which functioning, dimensioning, and need for adjustment should be evaluated.

### **Bayshore Continuous Shoreline Protection Study (Led by Municipalities and NJDOT Support)**

The Bayshore Continuous Shoreline Protection Study is a multi-municipal initiative aimed at enabling Atlantic City, Ventnor City, Margate, Longport, and Brigantine to leverage private investment and implement shoreline improvements with assets that are within their control (see Figure 4-3). This study would run parallel to USACE's Back Bays Plan, which is not funded, has not advanced beyond the initial study, and is anticipated to take over a decade and beyond to complete once adopted and funded.

### *Problem/Background Issues*

The bayside shoreline of Atlantic City, the three Downbeach municipalities, and Brigantine constitute the most significant vulnerability within the ACCR. Improving the shoreline along the bayside to help protect shoreline properties would also reduce risks in upland areas. However, implementing these improvements is complicated by the fact that land ownership along the shoreline is a patchwork of privately controlled properties and municipal streets, spanning four different municipalities. In recent years, properties in the Downbeach communities and Brigantine have seen improvements to shoreline protection as properties have turned over. Improvements in shoreline protection have also occurred on a larger scale as part of multifamily developments that have occurred during this period.

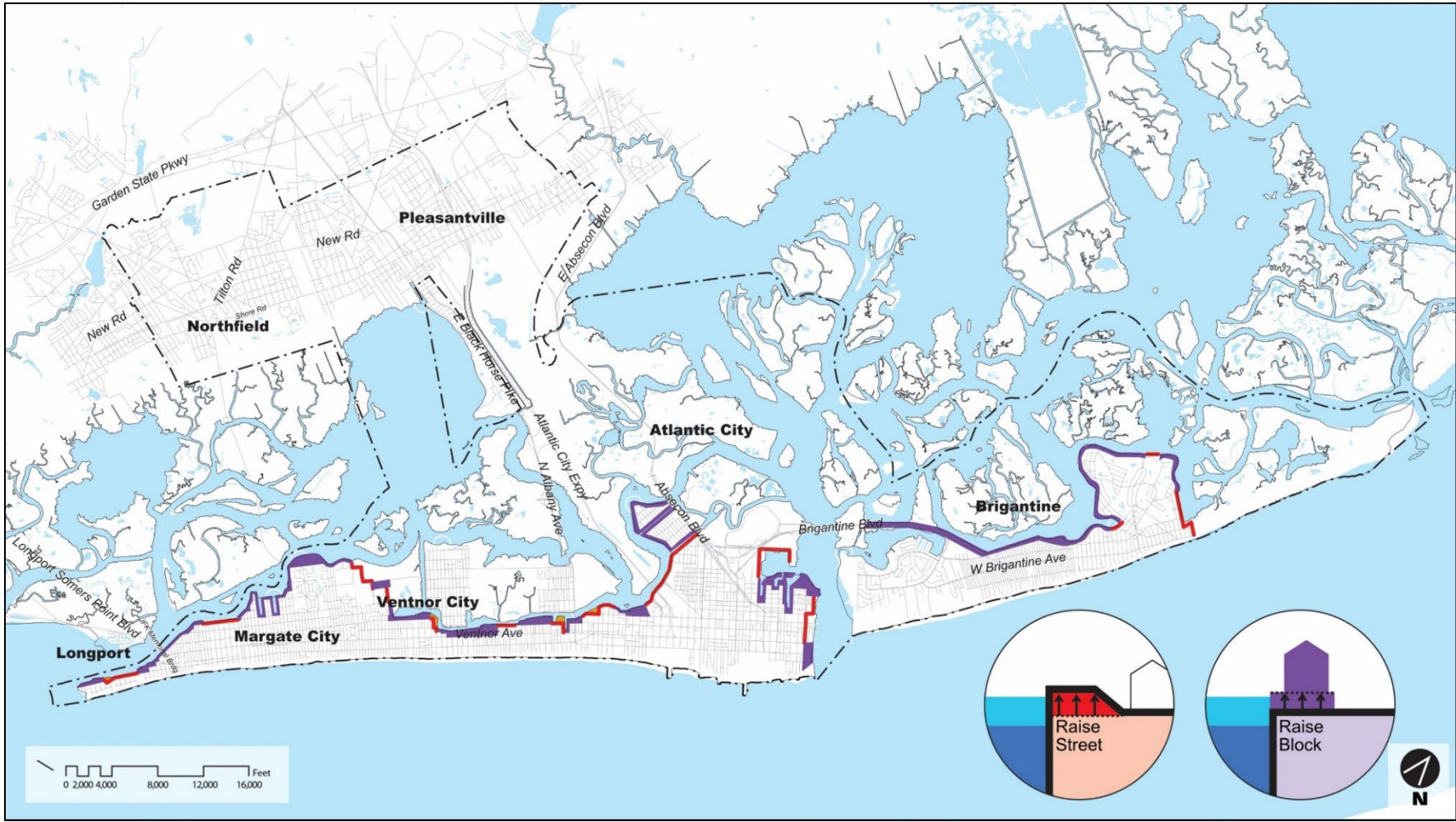
The Bayshore Continuous Shoreline Protection Study would address flooding that might be caused by SLR (SLR 2070) in the bayside of Atlantic City, Brigantine, and Downbeach communities. **Figure 4-3** illustrates a Preliminary Bayshore Continuous Shoreline Protection Study Area. During scoping for the study, additional ACCR areas, such as the Brigantine Cove, Ventnor Heights, Chelsea Heights, should be considered for inclusion.

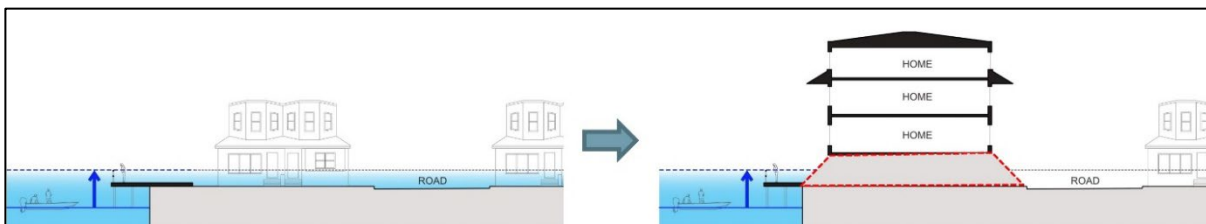
### *Solution*

The action would address the bay side shoreline's vulnerability to SLR and increased frequency of coastal inundation associated with climate change. This action is based on two major elements:

- ❖ Advancing shoreline infrastructure improvements on the assets within the control of the individual municipalities, raising the roads closest to, and paralleling the shoreline in Atlantic City, Ventnor City, Margate, Longport, and Brigantine. This action would involve linking many different segments of different streets to form a continuous multipurpose levee, including Fairmount Avenue and North California Avenue as it ties to Sunset Avenue in Atlantic City; and Winchester Avenue as it ties to Sunset Avenue in Longport, North Annapolis Avenue Chelsea Court, and North Harrisburg Avenue in Atlantic City. Issues with drainage on the upland side also need to be addressed.
- ❖ Because much of the Bayshore is privately owned, this action would also employ a public-private approach to bayside protection, allowing increased densities and encouraging assemblage of individual single-family lots to attract private investment for shoreline improvements. In return for increasing allowable densities for shoreline properties, new development would be required to implement shoreline improvements that would provide protection to upland areas. This could include raising the elevation of the lots and construction of multipurpose levees or flood barriers.

Figure 4-3. Preliminary Bayshore Continuous Shoreline Protection Study Area





**Image: Increasing Density for Shoreline Protection**

#### *Flood Protection, Safety, and Risk Reduction*

This action would protect upland properties from SLR (SLR 2070). This action would enhance protection for approximately 70 high-medium critical assets within Atlantic City, 11 in Brigantine, and 33 in the Downbeach area. Creation of a continuous line of protection on the bay side would extend protection to the SVPs in Atlantic City.

#### *Connection to Resilience*

These actions would provide shoreline protection from flooding and reduce the risk in upland neighborhoods.

#### *Co-Benefits*

By reducing shoreline properties to allow for increased densities, this action could attract increased private investment to the region. Raising streets could form a continuous multipurpose levee that offers the potential to create an elevated Greenway trail for recreational purposes, which could become a destination for visitors.

#### *Potential Funding and Finance Opportunities*

There is currently no funding secured for the implementation of this action. The funding needed for raising the roads along shoreline may be available through NJDOT's RAISE grants or similar grant programs. This action relies on private investment to fund needed improvements on private properties along the Bayshore and would leverage new development to implement shoreline improvements that would provide protection to upland areas.

#### *Entity with Jurisdiction Over the Action*

This study would be led by Atlantic City, Ventnor City, Margate, Longport, and Brigantine in partnership with NJDOT and NJDEP.

#### *Environmental Considerations*

As part of the Bayshore Continuous Shoreline Protection Study, environmental considerations will be analyzed in further detail to understand the potential to affect Absecon Bay's aquatic ecosystems and tidal marshes, either through direct or indirect impacts.

#### *Local, State, Federal Regulatory Requirements*

Local zoning development requirements would apply to increasing density along the bayside shoreline, and local and state roadway requirements would apply to roadway elevation projects.

### *Impact/Benefits to Socially Vulnerable Populations*

Due to the partial protection the action would provide for the ACCR area, this action would also enhance protection for the SVPs including low-income residents, LEP individuals, people with disabilities, seniors, and youth. In the long-term, this action may reduce the potential need for relocation due to SLR impacts on Absecon and Brigantine Islands. Given the bayside protection, the region's youth population would benefit from reduced SLR impacts for decades into the future.

### *Indication of Public Support*

The public expressed interest in elevating streets and increasing density to enhance bayside protection. The ACCR Steering Committee recognizes this action is a long-term strategic action that does not supersede other municipal projects but builds on those projects. The committee also recognizes that views of the back bays are important to the public and could be negatively impacted by implementation. Public support would be further gauged through the Bayshore Continuous Shoreline Protection Study.

### *Project Cost Estimate*

The cost to implement this project is estimated at:

❖ \$\$\$\$\$= Greater than \$10 million

This action relies on private investment, which is included in the cost estimate, to fund needed improvements on private properties along the Bayshore. Costs of private property implementation will vary from location to location. Estimated costs for roadway construction work by square foot of roadway are provided below because cost is heavily reliant on subsurface conditions. The cost for regular roadway maintenance is to be determined.

This action's implementation cost has been estimated for elevating roadways, as follows:

- ❖ Known subsurface issues – Cost is \$105/SF of roadway (based on the pavement area between curbs)
  - Working with unstable subgrade could require installation of sheeting, over-excavation, and replacement of soil with lightweight aggregate.
  - Includes reconstruction of pavement, drainage, underground utilities.
  - Includes 10-foot roadway berms with sidewalk in both directions.
- ❖ Normal subsurface conditions – Cost is \$62/SF of roadway
  - Includes reconstruction of all pavement, drainage, and underground utilities, but construction would not require sheeting and/or lightweight fill.
  - Includes 10-foot roadway berms with sidewalk in both directions.

### *Implementation Timeline*

Elevating roadway segments along the bayside is a mid-term action, with the beginning of construction estimated between 2030 and 2050. The construction is expected to be completed in 5 to 10 years following the start date. The lifespan of the protection provided by this action would be ongoing, as long as the raised roads are properly maintained. Raising Bayshore properties is a long-term action that depends on ongoing cycles of investment as properties turnover. Implementation can start as soon as a feasibility study can be completed and common standards among the Island's municipalities are established..



## **Bulkheads for Bayside Protection North End**

This action item is a Flood Mitigation Project that would protect the region from ocean water surge and flood conditions. In Brigantine, this action item would involve construction of a connecting series of new bulkheads (because of alternating private and public property boundaries) to protect the north end. The new bulkhead in Brigantine's north end would complement the USACE Back Bays Plan to ensure all communities are protected.

### *Problem/Background Issues.*

In recent years, Brigantine has partnered with the USACE to harden the Brigantine shoreline; however, a gap remains in the north end, which leaves row houses along the waterfront vulnerable to flooding. This action would address this vulnerability and complement the previous work on hardening the shoreline.

### *Solution*

This action item involves construction of an overall 300-foot-long bulkhead along 12<sup>th</sup> Street North to help protect the row of houses on the waterfront from flooding. The top elevation of this bulkhead would be approximately 12 feet to match the Brigantine Seawall and could be composed of a vinyl material. Alternatively, a 1,300-foot-long bulkhead would tie into the next bulkhead along the bayside, with the idea of building a continuous bulkhead at 8-foot elevations along the bayside. Further evaluation of vulnerability at the site scale is needed on the ocean-side and bayside shoreline to identify additional areas that may need bulkheads for protection.

### *Flood Protection, Safety, and Risk Reduction*

Construction of bulkheads will bring protection for residents at the north end of Brigantine from the mean higher high water (MHHW) + SLR 2070 (2.4 feet) rise in ocean water. This action would protect approximately 30 to 40 homes within the two blocks at the north end fronting the bulkhead. This level of protection would help avoid approximately \$ 6 million in losses to residential structures in the north end of Brigantine.

### *Connection to Resilience*

This action would provide shoreline protection from flooding and reduce risk to residential structures.

### *Co-Benefits*

This project would complement other resilience projects, such as beach nourishment, installation of sheet pile dune core, possible USACE Back Bays Plan implementation projects, and the Bayshore Continuous Shoreline Protection Study to provide more continuous protection along the shoreline and help maintain the valuable tourism and shore economy in this part of the ACCR.

### *Potential Funding and Finance Opportunities*

There is currently no funding available for this action. Potential funding sources for shoreline protection overall may be offered by the following shoreline protection programs:

- ❖ NFWF - National Coastal Resilience Fund
- ❖ NOAA - Coastal Resilience Grants for Coastal Communities
- ❖ FEMA - HMGP – flood protection

- ❖ NFWF, Wells Fargo - Resilient Communities Program - natural ecosystems, green infrastructure, SLR
- ❖ NFWF - Adaptation through Regional Conservation Projects - SLR, interconnectedness of natural systems
- ❖ NFWF, WHC, EPA - The Five Star and Urban Waters Program - improve stewardship of natural lands, improve water quality and quantity
- ❖ USACE and NFWF - Dredging and Placement Demonstration Projects
- ❖ USACE - Continuing Authorities Program
- ❖ ACE - Sustainable Communities Grant Program - protect, and improve public spaces such as local parks, natural areas, and recreation resources

#### *Entity with Jurisdiction Over the Action*

The City of Brigantine would lead this action with support from the state of New Jersey.

#### *Environmental Considerations*

This action would affect aquatic biology along the project area and permanently change the character of the shoreline along the relatively limited project area. It has the potential, along with the offshore jetty/groin project, to reduce possible breakthrough of the ocean to the bay just north of the project area, which could cause notable environmental disturbance if such an extreme weather event were to contribute to such breakthrough.

#### *Local, State, Federal Regulatory Requirements*

Local and state requirements would apply to permitting bulkheads. The US Fish and Wildlife Service administers the Forsythe National Wildlife Refuge and may have interest in any project that would affect access and natural and biological resources under their management.

#### *Impact/Benefits to Socially Vulnerable Populations*

This action is not geared toward the specific needs of SVPs.

#### *Indication of Public Support*

There is an implied support from the Brigantine residential community, based on ACCR Steering Committee engagement.

#### *Project Cost Estimate*

The estimated cost for this action is:

- ❖ \$\$\$\$= Greater than \$10 million

The cost of a 300-foot-long bulkhead is estimated as \$800 to \$1,000 per foot, for a total cost of \$300,000. Costs associated with an additional 1,300-foot-long bulkhead is estimated at \$1,300,000.

In addition to the project costs, regular maintenance costs would need to be estimated.

#### *Implementation Timeline*

This action is estimated to start between 2025 and 2030 as a short-term action. The project duration is 3 to 5 years. Once implemented, the lifespan of this action could be 30 years due to longer durability of vinyl material.

### **Absecon Bay Blue/Green Way (Led by Non-profit Organizations)**

This Planning and Regulatory action leverages the continuous multipurpose levee and continuous line of raised street segments proposed in the Bayshore Continuous Shoreline Protection Study to create a new recreational trail (Green Way) along the Blackhorse Pike and roads paralleling the shoreline that would be coupled with a network of interconnected kayak/canoe trails (Blue Way) connecting the various bays within the ACCR back bays, including Absecon, Lakes and Reeds Bays. See **Figure 4-4**.

#### *Problem/Background Issues*

The ecology and environmental health of the ACCR back bays is central to the ACCR's long-term resilience. It is also a place of great natural beauty, and a unique resource for water-oriented recreational activities. Encouraging people to observe, learn about, and enjoy the major regional natural resources has been a proven success in other parts of the state in raising awareness and building a constituency for maintaining and improvement initiatives.

#### *Solution*

This action proposes a network of interconnected kayak/canoe trails (Blue Way) connecting the various ACCR back bays that would be developed in conjunction with a new continuous trail along the bayside of Absecon Island (Greenway) located along newly elevated roadway segments, and streets parallel to the bay that connect access points on the bay (e.g., street dead ends along the bay). The Blue Way would include multiple locations for docking. These locations would be coordinated with the Green Way, existing public marinas, docks, boat ramps, and recreational fishing locations.

The Blue Way could connect with the Great Bay to the north, and the Great Egg Harbor Bay and Cape May County trail system to the south (the Jersey Island Blueway) to create a larger South Jersey network. The Green Way has the potential to connect to additional trail networks such as the Northfield/Pleasantville bike path (running north/south) and the Atlantic County Bikeway (running east/west). Interpretive signage relating to the history of the back bays, bay ecosystem services, and the connection to resilience and flood protection could be installed at key locations along the Blue/Green Way.

#### *Flood Protection, Safety, and Risk Reduction*

This action item would increase awareness of bay ecosystem services and the flooding protection they provide.

#### *Connection to Resilience*

The Absecon Bay Blue/Green Way would address a number of problems in the region, including vulnerability of the bayside for flood, and the need for equitable economic development for the region as well as the needs for the capacity building within the community. This item would fulfill multiple components of the resilience plan, including bayside protection, equitable economic development, natural resources, and capacity building.

Figure 4-4. Absecon Bay Blue/Green Way





### *Co-Benefits*

This action would provide multiple benefits, including ecotourism/recreation, capacity building, and economic development, and would promote environmental awareness and connections to the water, which are a key component of the region's identity.

### *Potential Funding and Finance Opportunities*

There is no funding secured for this action; however, the multiple benefits associated with the action could position it for a wide range of funding sources including:

- ❖ NJDEP Green and Blue Acres Programs
- ❖ The Trust for Public Land
- ❖ The Nature Conservancy
- ❖ NFWF - National Coastal Resilience Fund
- ❖ NOAA - Coastal Resilience Grants for Coastal Communities
- ❖ FEMA - HMGP – flood protection
- ❖ NFWF, Wells Fargo - Resilient Communities Program - natural ecosystems, green infrastructure, SLR
- ❖ NFWF - Adaptation through Regional Conservation Projects - SLR, interconnectedness of natural systems
- ❖ NFWF, WHC, EPA - The Five Star and Urban Waters Program - improve stewardship of natural lands, improve water quality and quantity
- ❖ USACE and NFWF - Dredging and Placement Demonstration Projects
- ❖ ACE - Sustainable Communities Grant Program - protect, and improve public spaces such as local parks, natural areas, and recreation resources

### *Entity with Jurisdiction Over the Action*

Representatives from Atlantic County suggested that the ACEA could provide sponsorship, because the Blue Way would promote a water-based economy and could provide economic development benefits for ACCR communities. Other potential sponsors would include the Trust for Public Land and The Nature Conservancy.

### *Environmental Considerations*

This action would promote awareness and enhance protection of the ecological area encompassing Reeds Bay, Absecon Bay, and Lakes Bay east of Absecon Island, an area of approximately 60 square miles. Establishing the Green Way along Blackhorse Pike would require additional analysis during the design phase to determine whether trails and/or sidewalks could be built within the existing rights-of-way or if adjacent natural/semi-natural areas would be disturbed.

### *Local, State, Federal Regulatory Requirements*

This action would use recreation planning, environmental conservation planning, and local planning mechanisms within the region and supporting organizations. Local and state regulatory compliance would be required for permitting and construction.

### *Impact/Benefits to Socially Vulnerable Populations*

This action is not geared toward the specific needs of SVPs, although it would increase recreational opportunities, enhance the region's connection to the water, and increase awareness of bay ecosystem services and the flooding protection they provide.



#### *Indication of Public Support*

Feedback from the ACCR Steering Committee, CAC, and public meetings suggested that the Green Way may not have to be strictly along the shoreline where private properties are located but could weave in and out to maintain public access (including for boat access), which is critical because connection to the water is very important for these communities and any action proposed along the shoreline should maintain that access to the water.

#### *Project Cost Estimate*

The planning cost estimated for this action is:

❖ \$\$ = Greater than \$25,000 but less than \$250,000

#### *Implementation Timeline*

This action is planned for the short term; implementation could take place between 2025 and 2030. The project cycles would last 3 to 5 years and would be an ongoing action.

## 4.2 Power and Communication Challenges

The ACCR Action Plan proposes a suite of actions to address power and communication challenges that might occur during or after a storm event. The aim is to maintain continuity of power and communication services for critical facilities, homes, and essential social and commercial services.

### **Community Microgrid Systems Study**

This is a Future Study/Analysis action that would help identify where to site solar power grid systems within the ACCR. This action item would reinforce local power distribution systems by using microgrids built on solar energy, Vehicle to Grid (V2G), or other renewables as a source of distributed energy. A microgrid operates while connected to the grid but can disconnect and operate in island mode on its own in a crisis such as a power outage or a major storm. The microgrid then uses its own local energy generation from renewable sources, fuel cells, batteries, or fossil fuels to supply power to the nearby buildings until the main grid is stable enough to reconnect. Microgrids address post-disaster continuity of power and communications. An example microgrid proposal within the ACCR is the Atlantic City Midtown 20-megawatt Microgrid system that will provide backup power to critical thermal energy facilities such as the AtlantiCare Regional Medical Center City Campus, Bally's and Caesars casino-hotels, and the Boardwalk Hall.

This action is a companion to the Nanogrids action, which will lead to other actions in the future, such as placement of microgrids around casinos/hotels or other major sites that can provide emergency services and support. This placement can be extended to essential small business in the immediate vicinity. To further logistics of developing microgrids within the region, this action would benefit from coordination with ACE.

The new distributed system of microgrid clusters would be associated with facilities that are identified as top critical assets in the ACCR. In addition, an analysis of FEMA category IV (and Category III) firehouses and other facilities would also be relevant. The new microgrids would include an equity component in leveraging existing facilities to provide continuous power to adjacent vulnerable populations (example locations: Longport City Hall, Margate City Hall, Ventnor Elementary School, and Ventnor City Hall). See **Figure 4-5**.

Figure 4-5. Example Community Microgrid Locations within the ACCR



### *Problem/Background Issues Addressed by This Action*

Short-term disruptions in energy and power distribution systems after major storm events affect the food supply, heating and air conditioning, access to medical care and supplies, and the communications capacity of the ACCR's residents. Exclusive reliance on large-scale, centralized hardening of the ACCR's power distribution is expensive, slow, and difficult to implement. As such, more decentralized and smaller-scale approaches to increase the resilience of local distribution systems should be explored to supplement ongoing hardening efforts and ensure continuity of power and communications and recovery from increasingly severe storm events and post-disaster situations. This action aims to address short-term disruptions in energy and power distribution systems after a storm event and shortages in the centralized energy grid that might occur as the demand increases with the changing climate. Community microgrids then increase energy resilience after a major storm event that causes a power outage and sustain power/energy distribution that communities would need to restart their lives and rebuild their environment.

### *Solution*

A critical step toward implementation of this action is a feasibility study of the microgrids. A feasibility study is necessary because there are fundamental barriers that impede the microgrid sector, including being in the early stage of the market, high uncertainty in the regulatory process, difficult operating environments, relatively higher capital expenditure costs (compared to fossil fuel incumbents), and high installation costs with the need for heavy investment upfront with a slow payback over an 8- to 15-year period. There is also a lack of certainty about steady and reliable customers with a capacity to pay.<sup>7</sup> A feasibility study could help evaluate the benefits of a community microgrid compared to the impediments and help find the right time for investments as capital costs continue to fall.

### *Flood Protection, Safety, and Risk Reduction*

Establishing microgrids in the region would provide protection from extended power loss from wind and/or flooding during a superstorm storm surge type of event. This study would also increase the capacity to protect top critical assets that are at risk for flooding throughout the region such as Longport fire station and police, Atlantic City, Brighton Avenue School, and the Margate fire station.

### *Connection to Resilience*

This action is linked to the Health and Populations component of Resilience criteria because it would help continue services for communities during or after a superstorm event. Investing in local distribution systems composed of solar and other renewable energy microgrids is a critical action for resilience because it can help improve the region's ability to restore power and communications more rapidly and maintain continuity of power distribution and the communication network in post-disaster recovery situations.

### *Co-Benefits*

The Community Microgrids System Study is a companion to the Nanogrids action.

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<sup>7</sup> USAID and National Renewable Energy Laboratory. 2020. Microgrids in Emerging Markets—Private Sector Perspectives. Available at <https://www.nrel.gov/docs/fy20osti/76841.pdf>

#### *Potential Funding and Finance Opportunities*

Although no funding has been secured for this action, the Microsoft - Breakthrough Energy Ventures Fund could be a potential funding source since this funding program invests in clean energy technology to combat climate change.

#### *Entity with Jurisdiction Over the Action*

The municipalities with support from multiple potential stakeholders and/or programs would lead the Community Microgrids Study. Potential stakeholders/programs include:

- ❖ NJ Combined Heat and Power/Distributed Generation Coalition
- ❖ NJ Board of Public Utilities
- ❖ NJDEP Air Quality, Energy, and Sustainability
- ❖ Energy Resilience Bank Program
- ❖ Global Warming Response Fund
- ❖ Microgrid companies such as Scale Micro Grid Solutions and Enchanted Rock
- ❖ Casinos, AtlantiCare Regional Medical Center, and Schools
- ❖ Ford Motor Company and SunRun
- ❖ Fermata Energy

#### *Environmental Considerations*

This action would not have a negative impact on the environment. As solar power becomes a source of energy, monitoring solar gain/exposure patterns in the region may be necessary.

#### *Local, State, Federal Regulatory Requirements*

It is not legal yet in New Jersey to build these types of microgrids, due to existing public utility franchise rights, but the NJ Board of Public Utilities has been pushing to modify these rules as part of its Town Center microgrid programs. Over the longer term, NJDEP and other agencies/stakeholders can coordinate with the NJ Board of Public Utilities to improve the proposed revisions to rules, making this type of microgrid feasible. In addition, there is high uncertainty in market regulations (among other obstacles such as difficult operating environments, relatively higher capital expenditure cost and high installation cost) that impedes investors from pursuing microgrid projects.

#### *Impact/Benefits to Socially Vulnerable Populations*

This action would provide protection from extended power loss from wind and/or flooding during a superstorm storm surge type of event for all ACCR populations, including low-income residents, LEP individuals, people with disabilities, seniors, and youth. Atlantic City and Pleasantville are both majority-minority populations with 40 percent and 23 percent of the population, respectively, living below the poverty line. Because an extreme weather event may exacerbate financial insecurity for these residents, protection from extended power loss during large events would reduce the potential for lost wages and other financial hardships for low-income residents. Protection from extended power loss and the associated health and safety impacts would benefit LEP individuals, primarily located in Atlantic City, Pleasantville, and Ventnor, whose language barriers may prohibit them from obtaining evacuation information. Protection from extended power loss would also benefit people with disabilities throughout the ACCR by reducing the potential need for evacuations and interruption to medical care and social and support services. Seniors, primarily located in Longport, Margate, Brigantine, and Atlantic City, who face challenges related to health, transportation, and communication would benefit from reducing the potential need for evacuations and interruption to



medical care. Given the long-term protection from extended power loss for the entire ACCR, the region's youth population would benefit from reduced storm impacts for decades into the future.

#### *Indication of Public Support*

The ACCR Steering Committee notes that there is not much resistance or controversy about this action within the community. Conversations with the community suggest that identifying appropriate community locations for future microgrids is important for the implementation of this action.

#### *Project Cost Estimate*

The planning cost of this project is estimated at:

❖ \$\$\$ = Greater than \$250,000 but less than \$1 million

#### *Implementation Timeline*

This action is proposed as a short-term action that could start between 2025 and 2035. It is estimated that the planning would take 1 to 3 years, and the total time for implementation is estimated to be 5 to 15 years.

### **Nanogrids - Encourage Solar Energy Panels on Rooftops and Surface Parking Lots**



Image: Solar Panels on at the Cincinnati Zoo Parking Lot.  
Source: Quadell, CC BY-SA 3.0 via Wikimedia Commons

This is a Planning and Regulatory action that proposes building nanogrids by installing renewable or solar energy panels on large impervious horizontal surfaces (e.g., rooftops or vacant parking lots) in the cities. In ACCR, this action focuses on identifying opportunities to provide renewable/solar sources for microgrids on roofs, parking, and vacant lots, as an alternative solution to using emergency generators that are heavily reliant on fossil fuel sources; therefore, this action promotes the use of renewable energy.

#### *Problem/Background Issues Addresses Specifically by this Action*

Exclusive reliance on large-scale, centralized hardening of the ACCR's power distribution would be expensive, slow, and difficult to implement. As such, more decentralized and smaller-scale approaches to increase the resilience of local distribution systems should be explored to supplement ongoing hardening efforts. This strategy could also prove important in meeting the region's longer-term energy demands.

#### *Solution*

This action encourages installation of solar panels for renovation and new construction projects to increase energy resilience during power outages. The action also includes adopting an incentive program to encourage installation of solar trellises at surface parking lots and batteries at all buildings



to encourage bidirectional charging for electric vehicles. This action could be incentivized through municipal zoning regulations. Additionally, feasibility studies within municipalities could identify areas for pilot projects, which could be a way to kick-start the implementation.

Coupled with microgrids, this action could address short-term disruptions in energy and power distribution systems after a storm event and shortages in the centralized energy grid that might occur as the demand increases with the changing climate. Solar energy could also contribute to energy resilience after a major storm event causing power outage and sustain the power/energy distribution that communities would need to restart their lives and rebuild their environment.

#### *Flood Protection, Safety, and Risk Reduction*

This study would increase the potential to provide power resilience to top critical assets that are at risk for flooding throughout the region. Establishing nanogrids in the region would provide protection from extended power loss from wind and/or flooding during a superstorm storm surge type of event. This strategy could also prove important in meeting the region's longer-term energy demands.

#### *Connection to Resilience*

The ACCR Action Plan proposes this action because solar energy has become very cost effective in the past decade and is a key source of electricity generation that is less reliant on fossil fuels. A regional map of the Potomac Electric Power Company indicates the ability of the electric grid to absorb solar power in the ACCR. The map indicates there is an extensive area in the ACCR that is suitable to interconnect large amounts of solar power.

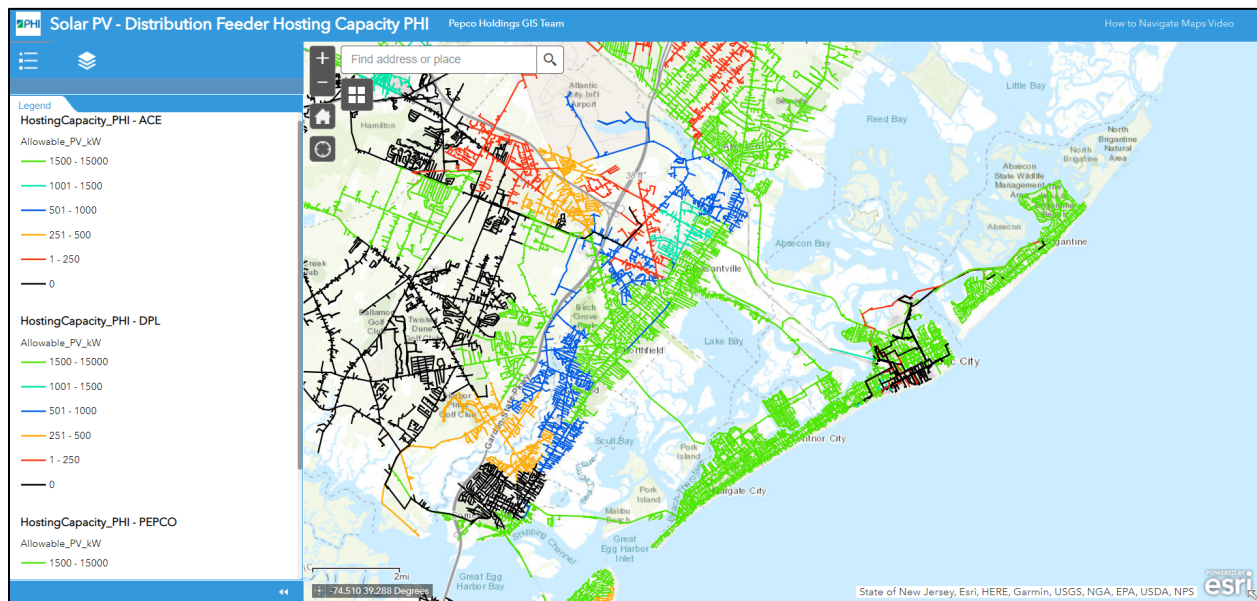


Image: Potomac Electric Power Company Hosting Capacity Map shows the ability of the electric grid to absorb solar power. Green areas are suitable to interconnect large amounts of solar and the areas that are red and black are more difficult to connect (Source: <https://www.pepco.com/SmartEnergy/MyGreenPowerConnection/Pages/HostingCapacityMap.aspx>)

#### *Co-Benefits*

The Community Microgrids System Study is a companion to the Nanogrids action.

#### *Potential Funding and Finance Opportunities*

Although there is no funding secured for this action, the Microsoft - Breakthrough Energy Ventures Fund could be a potential funding source since this funding program invests in clean energy technology to combat climate change.

#### *Entity with Jurisdiction Over the Action*

Municipalities would lead this action. Potential supporting organizations identified include community organizations with building facilities such as the YMCA, parking facilities, and stakeholders involved in renovation and new construction projects.

#### *Environmental Considerations*

There would be no direct impact on the environment; however, this action helps would reduce the carbon footprint by decreasing the reliance on fossil fuels.

#### *Local, State, Federal Regulatory Requirements*

This action recommends that municipalities develop an incentive program to encourage installation of solar trellises at surface parking lots and batteries at all buildings to encourage bidirectional charging for electric vehicles. As a part of this incentive, the municipalities could facilitate the solar panel installation by incorporating the regulations on solar/renewable installations into their zoning and building ordinance.

In the ACCR, Ventnor updated zoning and building ordinance to incentivize and regulate solar and renewable installation. Some other municipalities, including Atlantic City, Pleasantville, and Margate are in process of updating their zoning and building ordinances.

#### *Impact/Benefits to Socially Vulnerable Populations*

Coupled with microgrids, this action would provide protection from extended power loss during a storm event and shortages in the centralized energy grid that might occur as the demand increases with the changing climate. This action would enhance energy resilience for all ACCR populations, including low-income residents, LEP individuals, people with disabilities, seniors, and youth. Atlantic City and Pleasantville are both majority-minority populations with 40 percent and 23 percent of the population, respectively, living below the poverty line. Because an extreme weather event may exacerbate financial insecurity for these residents, protection from extended power loss during large events would reduce the potential for lost wages and other financial hardships for low-income residents. Protection from extended power loss and the associated health and safety impacts would benefit LEP individuals, primarily located in Atlantic City, Pleasantville, and Ventnor, whose language barriers may prohibit them from obtaining evacuation information. Protection from extended power loss would also benefit people with disabilities throughout the ACCR by reducing the potential need for evacuations and interruption to medical care and social and support services. Seniors, primarily located in Longport, Margate, Brigantine, and Atlantic City, who face challenges related to health, transportation, and communication would benefit from reducing the potential need for evacuations and interruption to medical care. Through enhancing energy resilience for the entire ACCR, the region's youth population will benefit from reduced storm and centralized energy grid climate impacts for decades into the future.

### *Indication of Public Support*

The public showed preference for decentralized solar actions. The ACCR Steering Committee feedback favors community solar on municipally owned land over a mandate for individual solar panel installation. The ACCR Steering Committee input indicates interest in community solar and reports that there has been success in community solar in this region, whereas individual solar installation has already been occurring on its own.

### *Project Cost Estimate*

The planning cost of this project is estimated at:

❖ \$\$ = Greater than \$25,000 but less than \$250,000

For this action, planning costs are estimated at \$200,000; additional scoping is needed to determine the cost of implementing the policies.

### *Implementation Timeline*

The implementation timeframe for short-term pilot projects is between 2025 and -2030, and for larger-scale implementations, the mid-term timeframe would be between 2030 and 2050.

## **Install Emergency Generators at Key Critical Facilities**

This action is a capital improvement project that involves installing new emergency generators at key critical facilities for emergency response sites the ACCR such as City Hall (for 911 continuity of service), emergency operation centers, shelters, firehouses, and schools. This action relies on a decentralized approach to responding to power disruptions from storm events.

### *Problem/Background Issues Addresses Specifically by this Action*

This action addresses potential disruptions in power, energy, and communication grids in the event of increased energy demand during the rising number of powerful storms.

Exclusive reliance on large-scale, centralized hardening of the ACCR's power distribution would be expensive, slow, and difficult to implement. As such, more decentralized and smaller-scale approaches to increase the resilience of local distribution systems should be explored to supplement ongoing hardening efforts.

### *Solution*

This action proposes to install new generators at all critical facilities in the ACCR to plan for continuous power during power disruptions and ensure continuity of emergency services and shelters. In the future, this action may transition away for the fossil fuel-based emergency generators to solar powered microgrids as future technology develops and the regulatory environment for microgrids evolves.

### *Flood Protection, Safety, and Risk Reduction*

Establishing emergency generators at critical facilities in the region would provide protection from extended power loss from wind and/or flooding during a superstorm storm surge type of event. Emergency generators could also protect top critical assets such as the City Hall of Atlantic City, Margate City Hall, Longport Borough Hall, Atlantic City Police Athletic League Building, and the Atlantic City Convention Center. There is also the potential to provide protection to a cluster of at-risk assets in Pleasantville at the western end of Black Horse Pike, approximately 15 at-risk economic assets

in Northfield, and the high-risk Meadowview Nursing Home in Northfield. As a next step, existing generators would need to be evaluated and the need for new generators at top critical assets identified including sizing.

#### *Connection to Resilience*

Investing in emergency generators is a critical action for resilience because it can help improve the region's ability to restore power and communications more rapidly and maintain continuity of power distribution and communication network in post-disaster recovery situations in the short term.

#### *Co-Benefits*

Installing Emergency Generators at Key Critical Facilities is a near-term solution to avoid extended power loss that could affect vulnerable populations in the region.

#### *Potential Funding and Finance Opportunities*

Potential sources of funding include:

- ❖ FEMA HMGP
- ❖ FEMA Pre-Disaster Mitigation Program
- ❖ FEMA BRIC
- ❖ US Department of Agriculture Communities Grant Program

#### *Entity with Jurisdiction Over the Action*

Municipalities would lead this action. Additional stakeholder support could include utility companies, neighborhood associations, community emergency response teams, social service agencies, the New Jersey Office of Emergency Management, and other community partners for emergency management.

#### *Environmental Considerations*

The reliance on fossil fuels for emergency generators contributes to carbon emissions.

#### *Local, State, Federal Regulatory Requirements*

Some of the obstacles that may delay implementation of microgrids are related to regulatory requirements. Therefore, in the short-term, installation of fossil fuel-based emergency generators provides a solution to extended power loss during and potentially after superstorm types of events.

#### *Impact/Benefits to Socially Vulnerable Populations*

This action would provide protection at all critical facilities in the ACCR to plan for continuous power during power disruptions and ensure continuity of emergency services and shelters. This action would provide health and safety benefits for low-income residents, LEP individuals, people with disabilities, seniors, and youth who are unable to evacuate during a large storm event due to language barriers and financial, mobility, and communication challenges. Continuous power at critical facilities could also benefit people with disabilities throughout the ACCR by reducing the potential interruption to medical care and social and support services. Seniors, primarily located in Longport, Margate, Brigantine, and Atlantic City, who face challenges related to health would also benefit from reducing the potential interruption to medical care.

#### *Indication of Public Support*

The ACCR Steering Committee indicated that new generators would be needed for all key emergency facilities (not just for firehouses and public buildings); therefore, the proposed action for installation of new generators is well received in general as long as this action is flexible and comprehensive to cover all key critical facilities identified.

#### *Project Cost Estimate*

The cost of this project is estimated at:

❖ \$\$ = Greater than \$25,000 but less than \$250,000

#### *Implementation Timeline*

This is a short-term action that is estimated to start between 2025 and 2030. The action would be implemented within 1 to 3 years along with developing generator maintenance plans to identify annual maintenance needs.

### **Harden Above-Grade Utility Poles and Bury Utilities to Create Fortified Grid**

This action is a capital improvement project that focuses on partial reinforcement of the existing infrastructure, in particular hardening all above-grade utility poles and underground major powerlines (where possible). This action is critical in maintaining the power and communication services because relocating distribution wires underground has been shown to improve reliability, and it helps avoid the outages that occur when power lines are knocked down due to heavy rain and wind.

#### *Problem/Background Issues Addresses Specifically by this Action*

Exclusive reliance on large-scale, centralized hardening of the ACCR's power distribution would be expensive, slow, and difficult to implement. As such, more decentralized and smaller-scale approaches to increase the resilience of local distribution systems should be explored to supplement ongoing hardening efforts. This strategy could also prove important in meeting the region's longer-term energy demands.

#### *Solution*

A critical first step toward implementation is to identify locations of above-grade utility poles that could be hardened or buried underground to understand whether those utility poles are in the purview of utility companies or municipalities, and which party is responsible for hardening the above-grade utility poles. For the implementation, the cost involved in building an underground grid and the costs associated with repair maintenance of that grid should be considered.

#### *Flood Protection, Safety, and Risk Reduction*

Hardening ACCR's power distribution, where possible, would provide protection from extended power loss from wind and/or flooding during a superstorm storm surge type of event. Overall, depending on the extent of implementation, this action could provide protection for the majority of critical assets and 33,668 structures in the region.

#### *Connection to Resilience*

This action would increase energy resilience by reducing the vulnerability of the existing power and communication lines through relocation underground.



### *Co-Benefits*

This action would increase the reliability of the power utility and help avoid outages.

### *Potential Funding and Finance Opportunities*

Currently, no funding is secured for this action. However, potential funding could be available through FEMA's BRIC Program and HMGP, as well as the New Jersey Office of Emergency Management's Hazard Mitigation Grant Program (once this action is identified as a part of a hazard mitigation event).

### *Entity with Jurisdiction Over the Action*

Utility companies with support from municipalities would lead this action. Within this partnership with municipalities, utility companies could potentially use Emergency Management Planning – Preparedness as a local mechanism for implementation. Additional stakeholders include the NJ Board of Public Utilities and NJDEP Air Quality, Energy, and Sustainability.

### *Environmental Considerations*

In the coastal neighborhoods, flood waters can damage the underground lines.

### *Local, State, Federal Regulatory Requirements*

There is no requirement mandated by municipal or county regulations; however, the action requires identifying the phased locations for the task of hardening the utility poles and bringing utility lines to underground. The task of maintaining some of the utility poles may be in the purview of municipalities.

### *Impact/Benefits to Socially Vulnerable Populations*

This action would provide protection from extended power loss from wind and/or flooding during a superstorm storm surge type of event for all ACCR populations, including low-income residents, LEP individuals, people with disabilities, seniors, and youth. Atlantic City and Pleasantville are both majority-minority populations with 40 percent and 23 percent of the population, respectively, living below the poverty line. Because an extreme weather event may exacerbate financial insecurity for these residents, protection from extended power loss during large events would reduce the potential for lost wages and other financial hardships for low-income residents. Protection from extended power loss and the associated health and safety impacts would benefit LEP individuals, primarily located in Atlantic City, Pleasantville, and Ventnor, whose language barriers may prohibit them from obtaining evacuation information. Protection from extended power loss would also benefit people with disabilities throughout the ACCR by reducing the potential need for evacuations and interruption to medical care and social and support services. Seniors, primarily located in Longport, Margate, Brigantine, and Atlantic City, who face challenges related to health, transportation, and communication would benefit from reducing the potential need for evacuations and interruption to medical care. Given the long-term protection from extended power loss for the entire ACCR, the region's youth population would benefit from reduced storm impacts for decades into the future.

### *Indication of Public Support*

There is no opposition or resistance from the communities; however, the utility companies serving the region would need to be engaged to scope next steps.

### *Project Cost Estimate*

The cost of this project is estimated at:

❖ \$\$\$\$= Greater than \$10 million

The project cost estimate for this action presents a large range. The cost could be 5 to 10 times more than overhead distribution lines according to the U.S. Energy Information Administration. Additionally, once power lines are buried underground, the maintenance could be costlier because accessing the lines can be more difficult if repairs are needed (e.g., damage from coastal flood waters).

#### *Implementation Timeline*

This action is planned as a mid-term solution and is estimated to start between 2025 and 2030. The implementation of the action would take approximately 5 to 10 years. The impact of this action is ongoing.

### 4.3 Access and Transportation Challenges

#### **Elevated Roadways – Evacuation Routes and Key Connectors**

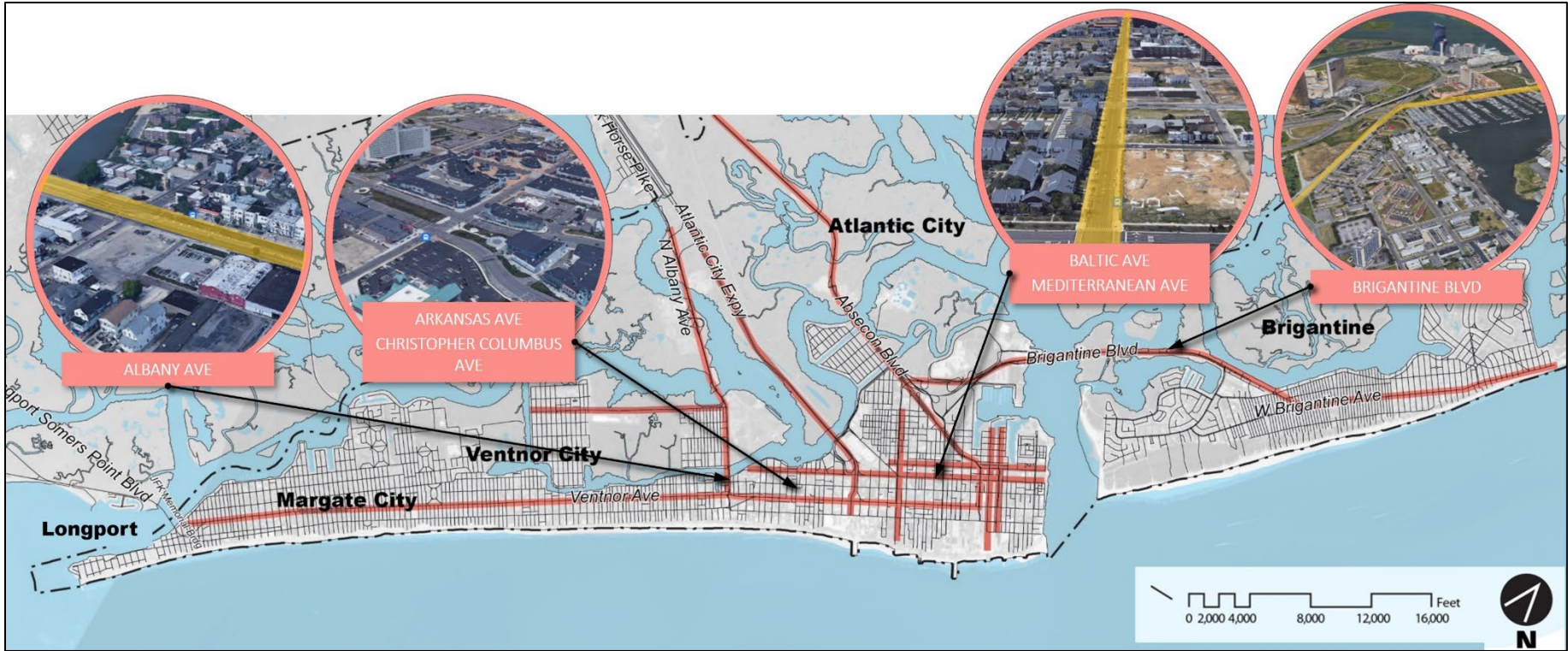
This action item is a Flood Mitigation Project that would involve raising evacuation routes and main arteries in Atlantic City, Downbeach, Brigantine, Pleasantville, and Northfield in coordination with the existing pump station locations. The action would address disruptions to evacuation operations and post-disaster recovery activities. Raising roadways on major evacuation routes on to and from Absecon Island and Brigantine Island would also address sunny day and nuisance flooding as these events become more frequent. See **Figure 4-6**.

#### *Problem/Background Issues*

With five of the ACCR's seven municipalities located on barrier islands, maintaining the bridges and access roads that provide access to and from the mainland is critical for disaster preparedness and post-disaster recovery. With SLR and the increasing frequency and severity of storm events, flooding along routes such as the Black Horse Pike has been occurring more frequently, impacting access to jobs and schools.

This action would increase access to evacuation routes from roadways that are the most impacted by MHHW + SLR 2070 + 1 percent annual chance, 24-hour storm event + 10 percent increase in rainfall.

Figure 4-6. Evacuation Routes and Key Connectors in the ACCR



### *Solution*

Proposed actions planned for major evacuation routes within the municipal borders of the ACCR include the following:

#### Atlantic City

- ❖ Raise roads on evacuation routes by approximately 3 feet including Baltic Avenue, Mediterranean Avenue, Connecticut Avenue, North New Jersey Avenue, and MLK Boulevard. Roadway elevations vary across Absecon Island; however, raising roads by approximately 3 feet would improve the accessibility of evacuation routes in the event of SLR (MHHW + SLR 2070) and major storm events triggered by increased precipitation (1 percent annual chance, 24-hour storm event + 10 percent increase in rainfall). Raising roadways more than 3 feet would be challenging based on the existing configuration of homes (e.g., driveways, garages, and the ground floor are currently at sidewalk level) and street parking.
- ❖ For narrower connector roads that are not feasible to raise, identify the next tier of roadways to raise that are wider, serve industrial and commercial uses, and that are not as impacted by flood projections.

#### Downbeach

- ❖ Raise Wellington Avenue to maintain its viability as an evacuation route.
- ❖ Raise JFK Memorial Bridge, Ventnor Avenue/JFK Memorial Bridge, Margate Bridge/Jerome Avenue, Absecon Boulevard/Absecon Boulevard Bridge.

#### Brigantine

- ❖ Raise all evacuation routes providing access to and from the area: Brigantine Boulevard/Brigantine Boulevard Bridge.

#### Pleasantville and Northfield

- ❖ Raise streets to EL +11 feet NAVD 88<sup>8</sup>: Blackhorse Pike, South New Road, Tilton Road, Fuae Avenue, Main Street, and north of Black Horse Pike. Raising streets such as Blackhorse Pike to EL+11 feet NAVD 88 would help ensure accessibility to a key evacuation link inland in the event of SLR (MHHW + SLR 2070) and a major storm event similar to Superstorm Sandy.

Additional consideration should be given to parking lot and parking garages if the roads that are chosen to be elevated provide a direct access to those garages.

### *Flood Protection, Safety, and Risk Reduction*

This action could prevent significant losses if implemented successfully in connection with the New Pump Stations action; a feasibility study could help identify the roads to be elevated according to locations of existing pump stations. This action item is planned to reduce losses that might occur in the event of SLR (MHHW + SLR 2070) and major storm events triggered by increased precipitation (1 percent annual chance, 24-hour storm event + 10 percent increase in rainfall). Potential losses in these types of events include loss of lives and property. This action item would either prevent those losses or reduce the risk of them because it would help maintain the roadway function and automobile and pedestrian mobility during these events. Raising roads along the evacuation routes and critical access

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<sup>8</sup> North American Vertical Datum of 1988

arteries would support evacuation operations and provide enhanced continuity for emergency services.

#### *Connection to Resilience*

This action is aimed at maintaining access to evacuation routes from roadways that are the most impacted by major storm events and SLR. This action supports the social component of the resilience plans because it would aid evacuation and rescue efforts by potentially protecting the transportation routes from the devastating impacts of storm events.

#### *Co-Benefits*

This action would help fortify evacuation routes, and thus would enhance continuity for emergency services.

#### *Potential Funding and Finance Opportunities*

No funding has been secured for this action item; however, NJDOT (in particular RAISE grants), USDOT Infrastructure For Rebuilding America grants, and Transportation Investment Generating Economic Recovery (TIGER Discretionary Grants) could provide funding for this action.

#### *Entity with Jurisdiction Over the Action*

This item would be led by the municipalities whose jurisdictions oversee the roads and evacuation on the identified major access roads. Atlantic County would support the planning and implementation led by municipalities because some of the critical access roads identified for this action are county roads. NJDOT also maintains major routes in New Jersey and would support the planning and implementation for state roadways such as the Black Horse Pike. Within municipalities and the county, transportation planning mechanisms should be used to implement this action.

#### *Environmental Considerations*

This action would have no direct impact on the natural environment; however, potential obstacles in the implementation of this action item (i.e., identifying the roads and the extent to which they would be elevated) needs to be reviewed to prevent environmental hazards that could be caused by construction.

#### *Local, State, Federal Regulatory Requirements*

A number of trade-offs have been identified as potential obstacles for this action, which may require revisions to planning ordinances.

Additional local challenges include:

- ❖ Some connecting roadways are narrow residential streets where driveways, garages, and the ground floor of homes are currently at sidewalk level.
- ❖ Leaving the sidewalk in place and raising the road would require a retaining wall to separate the street from the sidewalk.
- ❖ Street parking may be affected. Many residents rely on street parking to access their homes.
- ❖ Parking lot/parking garages/driveways/garage tie in's must also be considered.



- ❖ Critical infrastructure located within the roadway should be considered during a road elevation project.

#### *Impact/Benefits to Socially Vulnerable Populations*

This action would support evacuation operations and provide enhanced continuity for emergency services in the ACCR during a large storm event. This action would benefit all populations (residents, workers, and visitors) across the ACCR, including low-income residents, LEP individuals, people with disabilities, seniors, and youth. Supporting evacuation and rescue operations would provide health and safety benefits for all SVPs. This action would also address disruptions to post-disaster recovery activities, which would reduce the potential for lost wages and other financial hardships for low-income residents and the potential interruption to medical care and social and support services for seniors and people with disabilities.

#### *Indication of Public Support*

The ACCR Steering Committee recognizes that access to and from the barrier islands is a priority action for the region and supports raising roadways in strategic locations such as evacuation routes.

#### *Project Cost Estimate*

The cost of this project is estimated at:

- ❖ \$\$\$\$\$= Greater than \$10 million

Estimated costs for roadway construction work by square foot of roadway are provided below because costs are heavily reliant on subsurface conditions:

Known subsurface issues – cost is \$105/SF of roadway (based on the pavement area between curbs)

- ❖ Working with unstable subgrade could require installation of sheeting, over-excavation, and replacement of soil with lightweight aggregate.
- ❖ Includes reconstruction of pavement, drainage, and underground utilities.
- ❖ Includes 10-foot roadway berms with sidewalk in both directions.

Normal subsurface conditions – cost is \$62/SF of roadway

- ❖ Includes reconstruction of all pavement, drainage, and underground utilities, but construction would not require sheeting and/or lightweight fill.
- ❖ Includes 10-foot roadway berms with sidewalk in both directions.
- ❖ There will be an additional cost for regular maintenance of the roads, which needs to be estimated.

#### *Implementation Timeline*

Elevation of roadways on evacuation routes is planned as a mid-term action to start between 2030 and 2050. Implementation of the entire project would take 5 to 10 years; the impact of this action (lifespan) will be ongoing.

One critical step toward implementation concerns identifying feasibility of road elevations, which has been discussed with the ACCR Steering Committee.

## 4.4 Stormwater Management

The set of actions presented under stormwater management targets flooding caused by heavy rainfall events. These actions aim to mitigate downstream flash flood risks and improve drainage for Absecon Island and Brigantine Island. A number of the actions presented here would provide additional capacity for stormwater drainage through green infrastructure, while others such as new pump stations would use gray/engineering solutions for water removal from the inland neighborhoods.

### New Pump Stations

This action item is a Flood Mitigation Project that proposes installing additional pump stations to address stormwater management in low-lying areas during the flood events specifically in Atlantic City, Ventnor, Margate, Longport, and Brigantine; and installing back-up generators at pump stations for water and sewer systems. See **Figure 4-7**.

#### *Problem/Background Issues*

Lower elevation locations in the ACCR municipalities, especially on Absecon and Brigantine Islands, have seen an increase in nuisance and sunny day flooding, principally from high tides and intense precipitation. With the projected increase in severity and frequency of major precipitation and tidal/SLR events, this trend is expected to continue. Installation of new stormwater pump stations would support the existing stormwater management system and improve interior drainage by mitigating flooding on roadways and surrounding areas due to rainfall and high tides. This project would attenuate flooding at and near critical facilities, including top critical assets on Absecon and Brigantine Islands.

#### *Solution*

Overall, priority locations for new pump stations should be identified as a first step for implementation. For these new pump stations to be operated effectively, new backup generators would need to be installed, and both the pump stations and backup generators would need to be elevated out of projected flood elevations, given anticipated SLR.

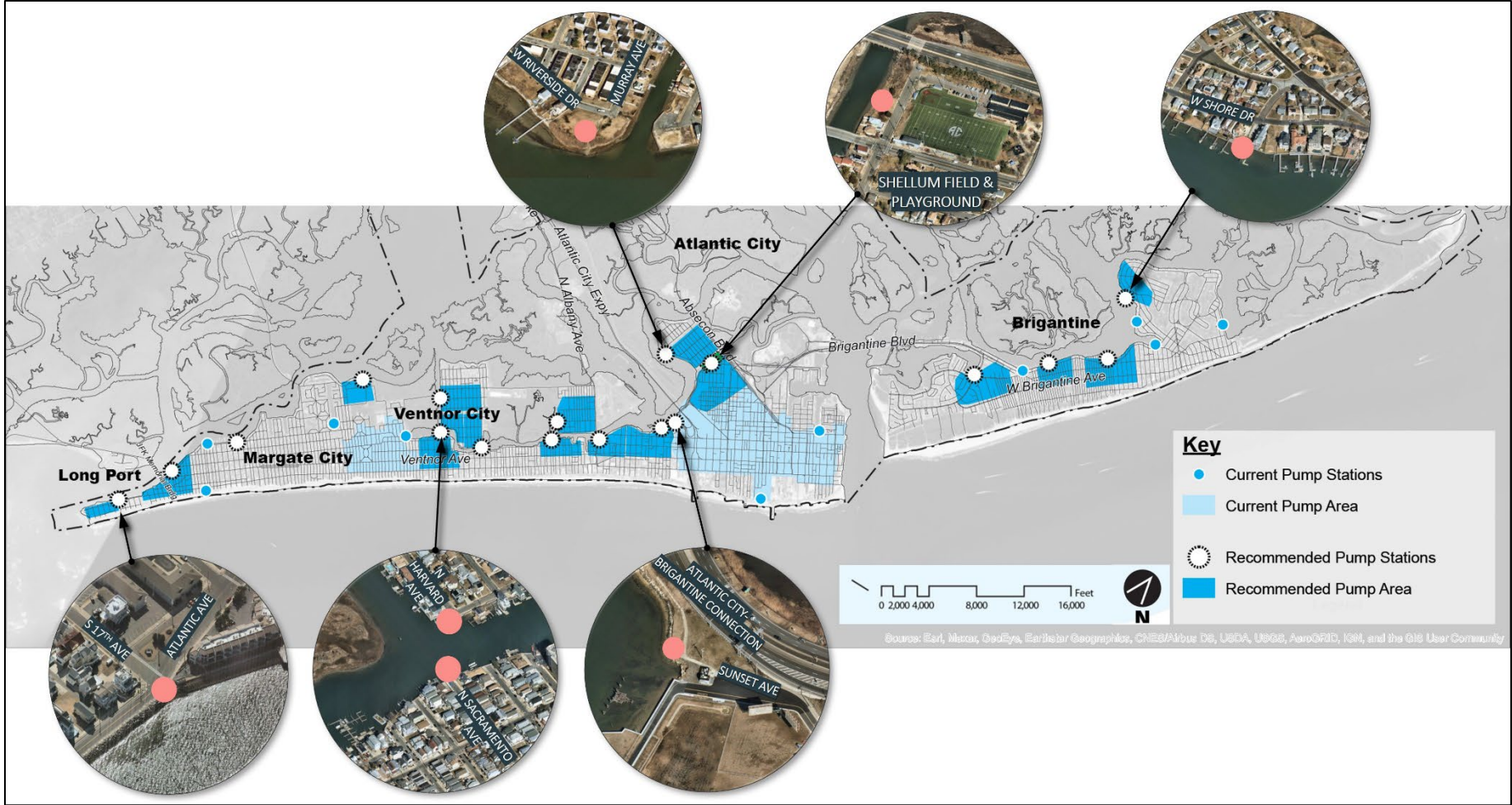
#### *Flood Protection, Safety, and Risk Reduction*

This action would improve interior drainage within a 2-square-mile area in Absecon and Brigantine Islands. The action targets protection against precipitation events with a 1 percent annual chance, 24-hour storm event and 10 percent increase in rainfall; therefore, it would protect 6,643 structures in ACCR region that would otherwise be affected by the referenced storm event.

#### *Connection to Resilience*

This action would help avoid losses to structures and roadways, maintain access to communities, and support evacuation operations through the major routes.

Figure 4-7. Recommended Pump Station Locations in the ACCR



### *Co-Benefits*

New Pump Stations complement the Elevated Roadways and Living Streets Feasibility Study and Pilot Program actions. New Pump Stations would improve drainage of flood waters from inland neighborhoods that may not otherwise have any natural pathway for water to drain toward the coast.

### *Potential Funding and Finance Opportunities*

No funding has been secured for this action item; however, funding programs focusing on stormwater management could be potential funding sources for this action:

- ❖ NOAA - Coastal Resilience Grants for Coastal Communities
- ❖ FEMA - HMGP – flood protection
- ❖ NFWF, Wells Fargo - Resilient Communities Program - natural ecosystems, green infrastructure, SLR
- ❖ NFWF - Community Capacity Building and Demonstration Projects - advance social cohesion, green infrastructure
- ❖ NJDEP and New Jersey Environmental Infrastructure Trust - New Jersey Environmental infrastructure Trust grant
- ❖ America's Transportation Infrastructure Act (ATIA) – resilient transportation
- ❖ NJDOT - NJDOT Grants for Streetscape Improvement Projects
- ❖ ACE - Sustainable Communities Grant Program - protect and improve public spaces such as local parks, natural areas, and recreation resources
- ❖ USACE - Continuing Authorities Program

### *Entity with Jurisdiction Over the Action*

This action would be led by individual municipalities based on catchment area of the stormwater. The plans and implementation efforts of the municipalities would be supported by the state. In particular, stormwater planning and management mechanisms within the municipalities need to be used.

### *Environmental Considerations*

Removal of flood water and drainage of interior water from the streets and residential surroundings would reduce the risk of water or moisture biohazard.

### *Local, State, Federal Regulatory Requirements*

Local and state regulatory compliance would be required through the municipalities and NJDEP.

### *Impact/Benefits to Socially Vulnerable Populations*

This action would improve interior drainage on Absecon and Brigantine Islands by mitigating flooding on roadways and surrounding areas due to rainfall and high tides. This action would benefit all populations (residents, workers, and visitors) on Absecon and Brigantine Islands, including low-income residents, LEP individuals, people with disabilities, seniors, and youth. Supporting evacuation operations and maintaining access to communities would provide health and safety benefits for all SVPs during large rainfall events. Helping to avoid loss of structures would reduce the potential for financial hardships for low-income residents and housing challenges for seniors. Maintaining access to communities would also reduce the potential interruption to medical care and social and support services for seniors and people with disabilities.

### *Indication of Public Support*

The public showed preference for this action, and the ACCR Steering Committee indicated ongoing community support for this action.

### *Project Cost Estimate*

The cost of this project is estimated at:

❖ \$\$\$\$ = Greater than \$1 million

Project cost is estimated to be approximately \$6.7 million, for installation of 18 pumps (\$375,000 per pump). Additional costs would be associated with regular maintenance of the pumps.

### *Implementation Timeline*

Installation of new pumps is planned as a short-term action to start between 2025 and 2030. Implementation of the entire project would take 3 to 5 years, and once implementation is complete the impact of this action would last for about 20 years, at which time renewal or replacement of the pumps would need to be considered.

## **Living Streets Feasibility Study and Pilot Program**

This action is based on the concept of upgrading existing streets for subsurface conveyance without pipes and thus forming a networked green infrastructure to reduce groundwater through evapotranspiration and structural soils. For this action, roadway infrastructure is amplified to function as a performative network to mitigate downstream flash flood risks and facilitate infiltration. The first step in this action is a feasibility study to identify locations where this concept would be appropriate and feasible. A pilot project would test implementation of the Living Streets concept at the selected location. See **Figure 4-8**.

### *Problem/Background Issues*

As the ACCR region looks ahead to longer-term challenges presented by the increased frequency and intensity of major storms and increased rainfall events, alternative strategies employing new technology should be considered. Improving stormwater management solutions could reinforce protection through reduction of losses for all people (residents, workers, and visitors) in Atlantic City, Brigantine, and Downbeach. It would also reinforce protection for SVPs who are concentrated in Atlantic City.

### *Solution*

The Living Streets concept uses two kinds of water drainage strategies: (1) Blue streets convey water flow, and (2) Green streets allow infiltration. Together the roadway infrastructure functions as a performative network to mitigate downstream flash flood risks and facilitate infiltration. As an engineering strategy for green streets, “structural” soil, a mix of soil and a stone structure, is strong enough to be load-bearing but can also allow tree roots to grow freely and help absorb more water in storms.<sup>9</sup>

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<sup>9</sup> Fast Company. 2021. When New York floods, this “living street” stays dry. November 10. Available at [When New York floods, this "living street" stays dry \(fastcompany.com\)](https://www.fastcompany.com/90600000/when-new-york-floods-this-living-street-stays-dry)



**Hydrologic Analysis**



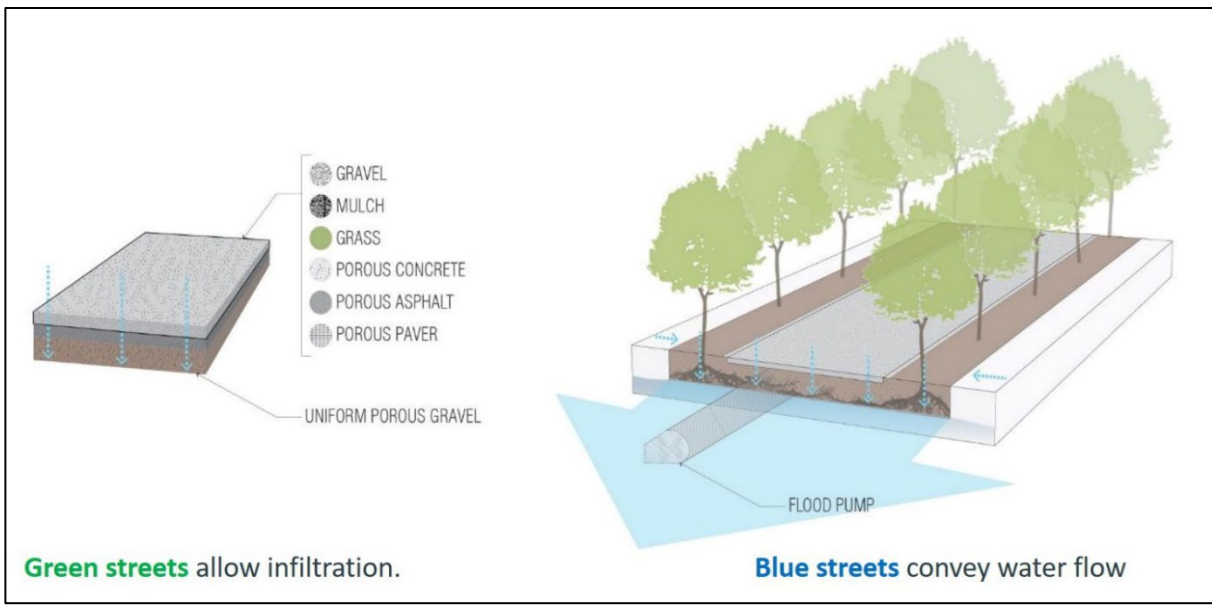


Image: Green and Blue Streets Diagrams (Source: Local Office Landscape Architecture)

The feasibility study would help identify locations where those strategies would be most appropriate. The feasibility study would include a hydrologic analysis of the existing topography to inform the selection of streets or other municipally owned open spaces such as parking lots where the Living Streets could be implemented. A feasibility study would incorporate cost-benefit analysis of the proposed engineering design.

Living Street strategies have been employed successfully at the Miracle Mile in Miami, which was designed by Local Office Landscape Architecture to incorporate infiltration and an interconnected forest of roots for bioretention, absorbing frequent rain events for the entire watershed. The performative landscape clusters trees to evapotranspire groundwater into the air, cooling the urban heat island in the city. The forward-thinking design allowed the commercial corridor to remain open after Hurricane Irma when surrounding neighborhoods faced elongated recovery periods. Miracle Mile is designed to handle up to 8 inches per hour of rainfall without flooding. During Hurricane Irma, Miracle Mile experienced 7 inches per hour, and the street performed as intended, resulting in minimal damage.<sup>10</sup>

#### *Safety, and Risk Reduction Specifically Provided by This Action*

Implemented at a broader scale, Living Streets infrastructure would improve the drainage in Absecon Island and Brigantine Island, and green infrastructure would provide additional drainage capacity. Living Streets coupled with green infrastructure could reduce losses for 4,735 structures that would be impacted by the 1 percent increase in 24-hour storm event plus 10 percent increase in rainfall. This action would enhance protection for approximately 70 high-medium critical assets within Atlantic City,

<sup>10</sup> Local Office Landscape Architecture. 2022. Miracle Mile Streetscape and Giralda Plaza, Coral Gables. Available at <http://localofficelandscape.com/projects/miracle-mile>

11 in Brigantine, 33 in the Downbeach area. This action would also reduce risk of interruptions in automobile and pedestrian mobility during high precipitation events.

#### *Connection to Resilience*

The Living Streets Feasibility and Pilot Study deals with stormwater management and is directly related to environmental and ecological changes that cause flooding and heavy precipitation events. The engineering design-based solution of this item would increase adaptation of urban/suburban environments to ecological changes overtime by bringing a mid-term solution.

#### *Co-Benefits*

The Living Streets action works together with New Stormwater Management Parks and New Pump Stations actions.

#### *Potential Funding and Finance Opportunities for Stormwater Management Actions*

Potential funding could be available through Stormwater Management programs of the following organizations:

- ❖ NOAA - Coastal Resilience Grants for Coastal Communities
- ❖ FEMA - HMGP – Flood Protection
- ❖ NFWF, Wells Fargo - Resilient Communities Program - natural ecosystems, green infrastructure, SLR
- ❖ NFWF - Community Capacity Building and Demonstration Projects - advance social cohesion, green infrastructure
- ❖ NJDEP and New Jersey Environmental Infrastructure Trust - New Jersey Environmental infrastructure Trust grant
- ❖ ATIA - resilient transportation
- ❖ NJDOT - NJDOT Grants for Streetscape Improvement Projects
- ❖ ACE - Sustainable Communities Grant Program - protect and improve public spaces such as local parks, natural areas, and recreation resources

#### *Entity with Jurisdiction Over the Action*

This action would be led by municipalities with potential supporting organizations that would be determined during the feasibility study.

#### *Environmental Considerations*

The ACCR Steering Committee notes that, as a potential obstacle, water drainage through green infrastructure may be hindered by sand drift in coastal areas. Sand may fill voids quickly, reducing the effectiveness of the infrastructure. Therefore, this may require enhanced preventive maintenance. The pilot program location should be located where reduced sand drift occurs.

#### *Local, State, Federal Regulatory Requirements*

No specific regulatory requirements were identified for this action. Regulatory requirements would be studied during the feasibility stage.

### *Impact/Benefits to Socially Vulnerable Populations*

Implemented at a broader scale, Living Streets infrastructure would improve interior drainage on Absecon and Brigantine Islands. Mitigating floodways on roadways and surrounding areas due to rainfall and high tides would benefit all populations (residents, workers, and visitors) on Absecon and Brigantine Islands, including low-income residents, LEP individuals, people with disabilities, seniors, and youth. Supporting evacuation operations and maintaining access to communities would provide health and safety benefits for all SVPs during large rainfall events. In addition, helping to avoid loss of structures would reduce the potential for financial hardships for low-income residents and housing challenges for seniors, while maintaining access to communities would reduce the potential interruption to medical care and social and support services for seniors and people with disabilities.

### *Indication of Public Support*

The public expressed interest in this action. The ACCR Steering Committee noted mixed support for this action, which informed the strategy to prioritize a feasibility study and pilot program so the most appropriate locations for the implementation and cost would be identified.

### *Project Cost Estimate*

The planning cost of this project is estimated at:

❖ \$\$ = Greater than \$25,000 but less than \$250,000

Higher capital costs than standard streets are expected for implementation, although maintenance costs could be lower (to be determined). The cost is expected is based on \$50/SF for the stormwater infrastructure only.

### *Implementation Timeline*

A feasibility study is identified as the first step toward implementation over the next 1 to 2 years.

Once the most appropriate locations for implementation are identified, the pilot projects could be implemented in select locations as a short-term action that could start between 2025 and 2030, and be implemented in 3 to 5 years. The committee proposes larger-scale implementation as a mid-term action that could start between 2030-2050 with a longer implementation timeline.

## **Create New Stormwater Management Parks**

This action proposes creating new “stormwater management parks” on city-controlled land in Pleasantville, and Northfield. This action is based on the concept of renovating and improving existing park infrastructure to play a role in the local stormwater management system. This action consists of a site selection study to identify the appropriate parkland that could play an effective role in managing stormwater as well as a feasibility study to assess the appropriate strategies for their improvement utilizing infiltration, retention, or detention as appropriate.

### *Problem/Background Issues*

As the ACCR region looks ahead to longer-term challenges presented by the increased frequency and intensity of major storms and increased rainfall events, alternative stormwater management strategies should be considered. To relieve the strain and the anticipated increase in demands on ACCR’s existing drainage infrastructure, green infrastructure strategies in existing public rights-of-ways, parking lots, and parks should be considered. Improving stormwater management solutions through parks could



reinforce protection by reducing losses for all people (residents, workers, and visitors) in Pleasantville and Northfield. It would also reinforce reduction of losses for SVPs who are concentrated in Pleasantville.



Image: Example Stormwater Management Park Location – Conovers Creek

#### *Solution*

Pleasantville and Northfield have a lower groundwater table than the ACCR barrier islands and therefore have more capacity for stormwater catchment through green infrastructure such as parklands. An initial conceptual siting analysis was completed using clusters of critical assets and vulnerable populations, which identified a number of parks and open spaces that might be designated as stormwater management parks, summarized as the following:

#### Northfield:

- ❖ Birch Grove Park could be retrofitted with large-scale constructed wetlands, bioretention, and changes in soil and subsurface characteristics to increase storage capacities including implementation of liners and/or underground storage that could be used for irrigation to offset any limitations with high groundwater tables. A retaining wall could also be used to contain the flow.

#### Pleasantville:

- ❖ The area near the intersection of Black Horse Pike and South New Road is along an evacuation route that is subject to flooding. This area could be retrofitted with constructed wetlands, bioretention, and/or underground storage that could be used for irrigation to offset any limitations with high groundwater tables.
- ❖ The area near Woodland Avenue Park and the intersection of Woodland Ave and North Third Street includes areas of natural depressions, some of which appear to include detention basins; these are potential locations for retrofitting to incorporate vegetated swales or other measures that allow for expanded storage capacity along streets near Atlantic City Expressway and N. New Road and Woodland Avenue Park.



- ❖ The area near Conovers Creek and West California Avenue, where several critical assets are located, could be redesigned and retrofitted to attenuate and store additional flow through modifications to soil and vegetation, with a goal of reducing flow entering into the creek during extreme weather events.
- ❖ Near the intersection of East Bayview Avenue and Hampden Ct, a bioretention facility, constructed wetland, and/or underground storage could be placed to address inland flooding at this location. Green streets in the form of infiltration trench/vegetated swale could be installed, and street trees could be implemented in the lower area, which is identified as being within a cluster of SVPs.

#### *Critical Next Steps*

Identifying backup issues from tides/raised water surface elevations from outfalls is recommended to determine and assess where additional flap gates to control flow direction could be installed, identify locations where additional local storage would be most effective in alleviating pipe capacity issues, and aid in identifying areas where green infrastructure and/or other mitigation measures are ineffective and installation of pumps is necessary (i.e., pumps could direct flow to regional facilities but a conceptual feasibility analysis would be needed to determine how much flow can be attenuated).

Facilities could be designed to infiltrate and/or could be designed with no infiltration in terms of modifying the soil and land characteristics and implementing other measures to allow for greater storage capacity.

Determining the soil characteristics is necessary to assess feasibility and estimate conceptual design runoff volume potential to determine how much area/runoff volume could feasibly be controlled.

The location of the groundwater table, wells, and septic systems should be determined to aid in any feasibility assessment.

Also recommended is implementing an incentive program that would reduce utility bills or offer other incentives for residential and commercial property owners to implement and maintain green infrastructure on their properties.

#### *Flood Protection, Safety, and Risk Reduction*

Stormwater management parks would mitigate flash flood risks, which would enhance protection of local open spaces that are part of the ecological system in the region. Reducing the flash flood risks reinforces protection for 6,643 structures in the area that might be impacted by a 1 percent increase in the 24-hour storm event and a 10 percent increase in rainfall, annually. The action would enhance protection for approximately 20 high-medium critical assets within Northfield and 47 in Pleasantville. It would also reduce the risk of interruptions in automobile and pedestrian mobility during high precipitation events.

#### *Connection to Resilience*

This stormwater management action is directly related to environmental and ecological changes that cause flooding and heavy precipitation events. The landscape and environmental engineering-based solutions that this action introduces aim to enhance adaptation of urban/suburban environments to ecological changes over time.

### *Co-benefits*

New Stormwater Management Parks would create an opportunity for environmental education and equitable economic development. The open spaces identified to function as stormwater management parks may be considered in connection to Living Streets Feasibility Study and Pilot Program if expanded to Northfield and Pleasantville. Existing parks or open spaces that are in higher elevation may be less appropriate for stormwater collection, but those parks could be integrated into the Living Streets system.

### *Potential Funding and Finance Opportunities*

In addition to the potential organizations and their programs listed for the Stormwater Management actions under Living Streets Feasibility Study and Pilot Program, the new stormwater management parks could be supported by a travel, tourism, and outdoor recreation New Jersey Economic Development Authority grant, which can be used to “rebuild and strengthen” those environmental recreation industries through various infrastructure and non-infrastructure projects.

### *Entity with Jurisdiction Over the Action*

This action would be led by municipalities with the support from organizations such as the Trust for Public Land. The implementation of this action would use stormwater planning mechanisms within municipalities and in the supporting organization.

### *Environmental Considerations*

The implementation plans for this action would require consideration of the high groundwater table in the ACCR overall. The action would also enhance protection of local open space.

### *Local, State, Federal Regulatory Requirements*

Local and state regulatory compliance would be required through the municipalities and NJDEP.

### *Impact/Benefits to Socially Vulnerable Populations*

Mitigating flash flood risks on roadways and surrounding areas due to rainfall would benefit all populations (residents, workers, and visitors) in Northfield and Pleasantville, including low-income residents, LEP individuals, people with disabilities, seniors, and youth. Maintaining access to communities would provide health and safety benefits for all SVPs during large rainfall events. Pleasantville is a majority-minority population with 23 percent of the population living below the poverty line. Helping to avoid loss of structures from flash flooding would reduce the potential for financial hardships for low-income residents.

### *Indication of Public Support*

The feedback from the ACCR Steering Committee suggests that municipalities should be encouraged, but not required, to adopt additional stormwater management regulations by retaining or reusing stormwater with cisterns, blue roofs, and rain gardens.

### *Project Cost Estimate*

The planning cost of this project is estimated at:

❖ \$\$ = Greater than \$25,000 but less than \$250,000

### *Implementation Timeline*

The committee proposes this action as a set of short-term pilot projects that could start between 2025 and 2030 with a project completion cycle of 5 to 10 years.

## **4.5 Equitable Economic Development**

The ACCR Action Plan proposes a suite of actions to capitalize on the economic dynamism in the ACCR. These actions support potential economic drivers and promote diversity in economic development with new land uses related to Blue Economy. The committee recommends these actions as a way to build economic capacity, so the protection and risk reduction actions are well supported.

### **Atlantic City Harbor Strategic Resilience Plan/Blue Economy Sites**

This action focuses on identifying redevelopment opportunities adjacent to Gardner's Basin and Delta Basin within the Atlantic City Harbor area. The aim is to support development for more intense use for maritime and Blue Economy-related economy uses. This action would create opportunities for a wider range of maritime land uses such as fishing and offshore wind turbines, while promoting investment in shoreline protection measures as a part of new development proposals, such as offshore wind components laydown areas, energy related manufacturing, solar power, and energy education center.



Image: Atlantic City Harbor Strategic Resilience Plan Study Area (highlighted in purple)

### *Problem/Background Issues*

As Atlantic City's economy continues to diversify, Blue Economy industries have emerged as one of the most promising potential options. Of these, offshore wind development opportunities in particular, continue to advance off the New Jersey coast. In the course of Resilient NJ scenario planning process, the Atlantic City Harbor was identified as the location best positioned to support Blue Economy uses,

but the ACCR and Atlantic City are positioned to provide other locations that may be optimal for offshore wind land operations including operations and maintenance facilities, marine access, and office space. This action offers a unique opportunity for attracting economic development to the region and private investment that could be leveraged to improve shoreline protection measures to enhance the overall resilience of Absecon Island in particular.

#### *Solution*

This action consists of a strategic plan to (1) identify parcels adjacent to Gardner's Basin and Delta Basin that could support redevelopment for Blue Economy uses, including a mix of maritime uses, (2) research the landside and waterside needs for these industries, and (3) create a plan to maximize Blue Economy uses, features that enhance and benefit established neighborhoods, as well as a more focused plan for shoreline protection and stormwater management.

#### *Flood Protection, Safety, and Risk Reduction*

Equitable economic development in the ACCR would enhance the safety net for changing climate, environmental, and economic conditions. With improved economic capacity, the region would have sources for restoration and protection of critical assets, such as Historic Gardner's Basin, which is considered as a medium risk critical asset. This action could also promote enhanced protection for SVPs in Atlantic City.

#### *Connection to Resilience*

This action is aimed at attracting Blue Economy industries and leveraging the associated private investment in these facilities to improve shoreline protection infrastructure along Atlantic City Harbor.

#### *Co-Benefits*

This action would complement the Bayshore Continuous Shoreline Protection Study by leveraging private investment at sites along Atlantic City Harbor to improve shoreline protection infrastructure that would contribute to increased bayside protection.

#### *Potential Funding and Finance Opportunities*

The Resilient NJ Program includes an implementation phase where the ACCR Steering Committee would select actions to advance toward implementation. As part of the Resilient NJ implementation phase, the Atlantic City Harbor Strategic Resilience Plan/Blue Economy Sites action is being initiated. As Atlantic City's economy continues to diversify, Blue Economy industries have emerged as one of the most promising potential options. Of these, offshore wind development opportunities in particular, continue to advance off the New Jersey coast. In the course of the Resilient NJ scenario planning process, the Atlantic City Harbor and areas along the Intracoastal Waterway were identified as locations best positioned to support Blue Economy uses but the ACCR and Atlantic City are also positioned to provide other locations that may be optimal for offshore wind land operations, including operations and maintenance facilities, marine access, and office space. This offers a unique opportunity for attracting economic development to the region and private investment that can be leveraged to improve shoreline protection measures that can enhance the overall resilience of Absecon Island in particular. In partnership with the Atlantic City Planning Department, the Resilient NJ implementation phase includes further evaluation of the Atlantic City Harbor sites and additional sites to determine feasibility for offshore wind land operations and opportunities to include additional maritime uses (e.g., Blue Economy) and features that enhance and benefit established neighborhoods. Findings can be used



by the Atlantic City Planning Department to inform future studies and outreach efforts to ACCR communities and offshore wind developers.

Rezoning/Redevelopment programs of the following organizations could potentially support future phases of this action:

- ❖ FEMA - HMGP – structural retrofitting of buildings
- ❖ DHS FEMA - The Flood Mitigation Assistance Program – risk of repetitive flood damage
- ❖ CRDA
- ❖ Atlantic City Redevelopment Program
- ❖ USDOT - Better Utilizing Investments to Leverage Development Grant Program
- ❖ U.S. Department of Energy - State Energy Program and Weatherization Assistance Program
- ❖ U.S. Department of Energy - Wind Energy Technologies Office - research, development, and demonstration projects to help the industry overcome key barriers to offshore wind development
- ❖ New Jersey Aspire Tax Credit Program
- ❖ Kresge Environment Program - building the climate resilience field by supporting activities to disseminate and bring to scale promising climate resilience approaches.

#### *Entity with Jurisdiction Over the Action*

Atlantic City would carry out this action.

#### *Environmental Considerations*

This action could entail dredging as well as modifications and improvements to shoreline infrastructure; as such it may impact shoreline ecosystems.

#### *Local, State, Federal Regulatory Requirements*

Local, state, and federal regulatory requirement compliance would likely be needed as development options are considered. Redevelopment, economic development planning, and recreation planning mechanisms are potential options for implementation.

#### *Impact/Benefits to Socially Vulnerable Populations*

By attracting Blue Economy industries and leveraging the associated private investment to improve shoreline protection infrastructure along the Atlantic City Harbor, this action could reduce risk for SVPs, including low-income residents, LEP individuals, people with disabilities, seniors, and youth in adjacent upland neighborhoods in Atlantic City. In addition, Atlantic City is a majority-minority population with 40 percent of the population living below the poverty line. Further development of Blue Economy industries could offer increased economic opportunity for low-income residents in Atlantic City and the region. In the long-term, increased opportunity through Blue Economy industries would also benefit the youth population within the ACCR.

#### *Indication of Public Support*

The public showed preference for encouraging Blue Economy land uses. The ACCR Steering Committee recognizes the importance of established neighborhoods, such as Bungalow Park in Atlantic City, and the social infrastructure they provide that promotes the ability for neighbors to support each other during preparedness, evacuation, and recovery from large storm events. Minimum disruption to this social fabric is important when considering future adjacent development.



#### *Project Cost Estimate*

The planning cost of this project is estimated at:

❖ \$\$ = Greater than \$25,000 but less than \$250,000

The planning cost of this action is approximately \$150,000.

#### *Implementation Timeline*

While the strategic plan could be developed in the short term, the redevelopment implementation is identified for the mid-term with an estimated start time between 2030 and 2050 with an estimated duration of 5 to 10 years.

### **Dredge Management Plan for Elevation of Development Sites**

This action is a Future Study/Analysis that would outline a coordinated program to reuse dredge spoils from all ongoing and future dredging projects in the region to raise development sites within the ACCR such as the Bader Field site. See Figure 4-9.

#### *Problem/Background Issues*

The ACCR Steering Committee has noted the ongoing need for dredge projects in the ACCR area. Dredge material is costly to transport, and opportunities may exist to reuse clean sediment that is dredged to elevate local ACCR development sites in the future.

#### *Solution*

Developing a Dredge Management Plan for Elevation of Development Sites would outline a path forward for identifying ways to reuse dredge spoils locally along with preliminary project sites that would benefit from beneficial reuse of dredge materials. This action would provide important synergies between local projects to improve stormwater capacity, maintain navigational channels, and provide ongoing economic development initiative in the ACCR. For example, redevelopment of Bader Field is of regional importance in providing a new potential engine of growth and jobs as well as a location for those displaced over time by the impacts of climate change. Reusing dredge spoils to elevate the low-lying area in combination with other flood proofing and resilience measures would help ensure the site's ability to withstand the coastal environment in future decades. Other low-lying development sites could include the Cove and Borgata sites.

#### *Flood Protection, Safety, and Risk Reduction*

This action would provide site-specific enhanced protection to SLR (SLR 2070) and potentially to storm surge in combination with other flood-proofing and resilience measures.

Figure 4-9. Bader Field under 2070 Flooding Condition



Note: Figure shows MHHW+SLR 2070 + 1 percent Annual Chance, 24-Hour Storm Event + 10 percent Increase in Rainfall.

#### Connection to Resilience

This action is aimed at developing synergies between ongoing local dredging projects and the ongoing economic development within the region in a way that helps to ensure new development sites have enhanced protection from SLR and storm surge.

#### Co-Benefits

This action offers multiple benefits, including reusing dredge materials for wetland restoration areas in addition to elevation of development sites. Additional sites that could benefit from the beneficial reuse of dredge materials are Shelter Island co-owned by Ventnor and Margate and the Gateway site in Pleasantville. This action is also a companion to the Atlantic City Harbor Strategic Resilience Plan/Blue Economy Sites action since elevating development sites could provide additional locations for Blue Economy land uses within the ACCR.

### *Potential Funding and Finance Opportunities*

Governmental and private funding mechanisms for beneficial use projects (e.g., taxes such as a sales tax surcharge, grants through entities such as Sea Grant, loans, and cost-sharing programs such as public-private partnership) are available. Diverse sources of funding may need to be considered such as State Revolving Funds, tax-increment financing, community bond bank, mini-bonds, endowment funds, or creation of a Special Assessment District, habitat or parks and recreation stamps, Adopt-an-Animal Program, or commemorative license plate program.<sup>11</sup>

### *Entity with Jurisdiction Over the Action*

The USACE oversees the majority of dredging projects. NJDEP, NJDOT, and ACCR municipalities could support the development of the Dredge Management Plan.

### *Environmental Considerations*

Dredge material contamination is an environmental consideration when planning to identify alternate uses for dredged material. Beneficial reuse of dredge materials (clean sediment) could provide ecosystem benefits. For example, thin-layer deposition and nesting bird habitat creation have been completed in pilot form in Stone Harbor.

### *Local, State, Federal Regulatory Requirements*

Local, state, and federal regulatory compliance would be required with the municipalities (development sites), NJDEP, and USACE.

### *Impact/Benefits to Socially Vulnerable Populations*

This action is not geared toward the specific needs of SVPs; however, it could benefit SVPs in proximity to future elevated development sites through enhanced protection from SLR and storm surge when combined with other flood-proofing and resilience measures. Specific populations that would benefit would depend on the location of the elevated development sites.

### *Indication of Public Support*

The ACCR Steering Committee supports restoration using dredge materials and a Dredge Management Plan to move forward with next steps and explore the multiple benefits the beneficial reuse of dredge materials could provide to the region.

### *Project Cost Estimate*

The planning cost for this action is estimated at:

❖ \$\$ = Greater than \$25,000 but less than \$250,000

### *Implementation Timeline*

While the Dredge Management Plan could be developed in the short term, the dredge material implementation is identified for the mid-term with an estimated start time between 2030 and 2050 and

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<sup>11</sup> US EPA and USACE. 2007. Identifying, Planning, and Financing Beneficial Use Projects Using Dredged Material Beneficial Use Planning Manual. Available at [https://www.epa.gov/sites/default/files/2015-08/documents/identifying\\_planning\\_and\\_financing\\_beneficial\\_use\\_projects.pdf](https://www.epa.gov/sites/default/files/2015-08/documents/identifying_planning_and_financing_beneficial_use_projects.pdf)

an estimated duration of 5 to 10 years for beneficial reuse of dredge material projects identified in the plan.

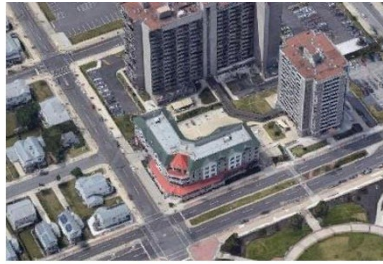
#### 4.6 Vulnerable Populations and Public Facilities

The ACCR Action Plan proposes a suite of actions focused on enhancing resilience for SVPs.

##### **Adaptation Action Plan for Atlantic City and Pleasantville Housing Authority Communities and the Region's Senior Centers**



Altman Towers



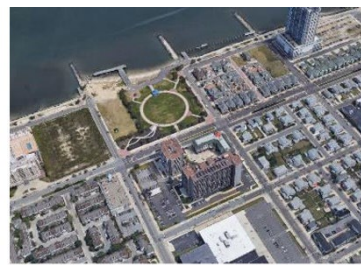
Whittington Senior Living



Walter Buzby



Stanley Village



Charles P. Jefferies

**Image: Atlantic City Housing Authority Communities**

This is a Future Study/Analysis action that concerns developing an action plan for the housing authority communities and senior centers in Atlantic City and Pleasantville. This action plan would focus on maintaining the continuity of service during emergency situations in community and senior housing by elevating electrical and mechanical equipment, installing solar trellises on all surface parking lots and solar panels on all rooftops, placing battery equipment to provide off-grid capacity at night, and replacing impervious surface with porous paving and green infrastructure planting for stormwater management. Additionally, this action plan aims to enhance flood mitigation by reprogramming the ground level uses.

##### *Problem/Background Issues Addressed by the Actions*

The residents of the Atlantic City and Pleasantville housing authorities and the region's senior center communities constitute one of the ACCR's most vulnerable populations. The facilities of both housing authorities represent a significant collection of assets dedicated to housing these populations. Many of these facilities are in areas vulnerable in the short and long term to stormwater flooding, coastal inundation, and SLR. These risks are expected to increase with time.



### *Solution*

In the short term, implementation for this action could start immediately by formulating adaptation design guidelines for the Atlantic City and Pleasantville housing communities, which could use funding already in place. In the long term, development of an Adaptation Action Plan could also include strategic planning for potential redevelopment of the most vulnerable communities.

### *Flood Protection, Safety, and Risk Reduction Avoided by the Actions*

This action would help avoid losses from SLR (SLR 2070) and storm events due to a 1 percent increase in precipitation and annual chance of 24-hour storm plus a 10 percent increase in rainfall and storm surge events in affordable housing environments and reduce negative impacts of those losses on vulnerable populations. The plan would help reduce losses in the 15-20 housing authority community and senior center facilities located in Atlantic City and Pleasantville's jurisdiction. This action would also enhance protection of critical assets such as the Pleasantville Housing Authority Tower Annex, which is a medium risk asset.

### *Connection to Resilience*

This action supports the social component of the resilience plan because it would reduce losses in affordable housing units and senior centers that accommodate vulnerable populations.

### *Co-Benefits*

This action would ensure continuity of livability and quality of life within the housing communities.

### *Potential Funding and Finance Opportunities*

Funding is available for retrofits to Stanley Village and Walter Buzby Housing Authority Communities in Atlantic City. Additional funding could be explored through the FEMA HMGP – Structural Retrofitting of Buildings Program. Additional engagement with the housing authorities is needed to identify viable funding opportunities.

### *Entity with Jurisdiction Over the Action*

The housing authorities and the municipalities would lead this action with potential support from the New Jersey Office of Emergency Management.

### *Environmental Considerations*

This action would have no negative impact on the environment; conversely improvements in affordable housing environments with replacement of impervious surfaces with porous materials and green infrastructure could support stormwater management and enhance the protection of the natural environment.

### *Local, State, Federal Regulatory Requirements*

Local and state regulatory compliance would be required, and emergency management planning and preparedness mechanisms could be used in implementation. Emergency Management Planning - Preparedness mechanisms in the leading municipalities could be utilized in implementation.

### *Impact/Benefits to Socially Vulnerable Populations*

This action would positively affect Atlantic City and Pleasantville, where SVPs are concentrated since the action focuses on low-income individuals and seniors. Atlantic City and Pleasantville are both



majority-minority populations with 40 percent and 23 percent of the population, respectively, living below the poverty line. Because an extreme weather event may exacerbate financial insecurity for these residents, protection from disruption during large events would reduce the potential for lost wages and other financial hardships for low-income residents. Seniors would also benefit from continuity of livability, services provided, and quality of life within the senior centers.

#### *Indication of Public Support*

The public showed preference for this action. The ACCR Steering Committee supports this action with interest in potentially pursuing the existing retrofit funding to incorporate adaptation measures and/or design guidelines as a first step.

#### *Project Cost Estimate*

The planning cost of this project is estimated at:

❖ \$\$ = Greater than \$25,000 but less than \$250,000

The planning cost for this project is estimated to be \$200,000.

#### *Implementation Timeline*

This action is planned for a short term and could be initiated in the 2025-2030 timeframe. Implementation is estimated to take 1 to 3 years.

### **Evaluate and Improve Preparedness Actions for Socially Vulnerable Populations**

The action to Evaluate and Improve Preparedness Action for SVPs is a Community and Outreach action. The main elements of this action emerged from stakeholder engagement with SVPs through Focus Group and Community Conversation meetings. The recommendations fall into four main categories focusing on increasing preparedness for a major storm event: (1) evacuation protocols, (2) shelters; (3) outreach and education efforts, (4) social services and wellness.

#### *Problem/Background Issues*

Through the ACCR Resilient NJ stakeholder engagement process, low-income residents, LEP individuals, people with disabilities, and seniors voiced several concerns related to preparedness actions. Many of the concerns related to residents' experiences during Superstorm Sandy. Overall, many improvements have been made related to emergency preparedness, but the feedback provided through Resilient NJ provides an opportunity to explore whether gaps exist and if additional improvements are needed. Other related issues include the American Red Cross's regulations that prohibit shelters to be located on barrier islands. Per ACCR Steering Committee suggestions, allowing shelters on Absecon and Brigantine Islands would allow residents to shelter in locations closer to home, potentially facilitating post-disaster recovery.

#### *Solution*

Advancing preparedness actions for SVPs improves the flow of evacuation operations and enhances community preparedness for storm events. This action would provide the plans and protocols for preparedness and the response and recovery phases of the disaster management cycle, so displaced residents could be placed in safe and livable shelters with food, essential supplies, and support services. This action item would formulate what is needed to maintain the communities' access to informational sources needed to sustain their well-being during storm events and post-storm time periods.

Additionally, the action would identify specific needs and requirements of SVPs to be addressed in shelters, because continuity of services is critical.

Additional stakeholder feedback suggested training programs could be offered to school age children, who may be able to translate emergency preparedness and evacuation instructions to their non-native speaking family members.

Each of preparedness actions involves the following:

❖ Evacuation Protocols

- Evacuation vehicles to accommodate people with medical issues or medical devices
- Evacuation personnel training/planning (e.g., movement of medical equipment, people with disabilities, older adults in high-rise buildings)

❖ Shelters

- Designated shelter for people with disabilities; children with special needs
- Power outlets for medical devices and accessible bathrooms
- Program focused on single parents
- Support services for residents with pets
- Food services to accommodate allergies/special diets

❖ Outreach and Education

- Consistent region-wide evacuation plan information (social media and non-digital channels)
- Training on how to digitize documents/storage of essential documents for evacuation
- Monthly information sessions about resources and programs available for disaster preparation and assistance (e.g., access to food, medicine, medical devices, blankets)

❖ Social Services and Wellness

- Ensure social services (e.g., homeless shelters) are more accessible throughout the region
- Organize special teams to help community members access social service programs and mental health assistance during response/recovery phases.

*Flood Protection, Safety, and Risk Reduction*

This action item aims to build the region's capacity for preparedness and post-disaster recovery protection, while reducing loss of life and injury from a major storm event.

*Connection to Resilience*

This action informs the social component of the resilience plan because it would improve preparedness actions and operationalize the evacuation plans; therefore, it would help avoid death and injury within communities and help decrease the traumatic impact of the storm event on SVPs.

*Co-Benefits*

This action would improve emergency preparedness and communication of evacuation procedures, along with the Translate All Emergency Preparedness Materials action. This action item has the potential to positively affect Atlantic City and Pleasantville, where SVPs are concentrated.

### *Potential Funding and Finance Opportunities*

The Resilient NJ Program includes an implementation phase where the ACCR Steering Committee would select actions to advance toward implementation. As part of the Resilient NJ implementation phase the Evaluate and Improve Preparedness Action for SVPs action is being initiated through the development of an Evacuation Communications Plan to complement the existing Evacuation Plan and Post-Evacuation Plan, to enhance community preparedness. As an operational plan, the Evacuation Communications Plan would focus on communication-oriented actions that local government stakeholders and their Whole Community partners can take to enhance evacuation communications during each phase of the disaster management cycle (i.e., mitigation, preparedness, response, and recovery). A goal of the Evacuation Communications Plan is to consolidate existing evacuation communications resources from local government stakeholders and Whole Community partners (e.g., the American Red Cross) and improve the accessibility and utility of existing resources. Another goal of the Evacuation Communications Plan is to improve evacuation-specific communication and coordination activities between stakeholders and Whole Community partners.

The American Red Cross Prepare NJ is considered one of the potential partners for continuing to advance the Evaluate and Improve Preparedness Action for SVPs action.

### *Entity with Jurisdiction Over the Action*

This action would be led by the ACCR municipalities and the American Red Cross with the potential support of Boys and Girls Club of America.

### *Environmental Considerations*

There are no specific environmental conditions that would be directly affected by this action item.

### *Local, State, Federal Regulatory Requirements*

Local and state regulatory compliance would be required, and emergency management planning and preparedness mechanisms could be used in implementation.

### *Impact/Benefits to Socially Vulnerable Populations*

This action is geared toward low-income residents, LEP individuals, people with disabilities, and seniors who may not have the income or resources for a rescue operation during a storm event (e.g., resources to obtain food, shelter, or social services) and may not have the access to the mainstream communication (e.g., the news and media) due to communication challenges or their non-English speaking status. Atlantic City and Pleasantville are both majority-minority populations with 40 percent and 23 percent of the population, respectively, living below the poverty line. Because an extreme weather event may exacerbate financial insecurity for these residents, enhancing community preparedness for large events would improve response and recovery and reduce the potential for lost wages and other financial hardships for low-income residents. Enhancing community preparedness would also benefit LEP individuals, primarily located in Atlantic City, Pleasantville, and Ventnor, whose language barriers may prohibit them from obtaining evacuation information. Improving preparedness would benefit people with disabilities throughout the ACCR by improving evacuation response and reducing the potential interruption to medical care and social and support services. Seniors, primarily located in Longport, Margate, Brigantine, and Atlantic City, who face challenges related to health, transportation, and communication would also benefit from improving preparedness and evacuation response, and reducing the potential interruptions to medical care.

### Indication of Public Support

Low-income residents, LEP individuals, people with disabilities, and seniors voiced support for these improvements through Focus Group and Community Conversation meetings.

### Project Cost Estimate

The planning cost of this project is estimated at:

❖ \$\$ = Greater than \$25,000 but less than \$250,000

The cost estimation would be tied to further evaluation of the preparedness actions identified.

### Implementation Timeline

This is a short-term action targeted to start between 2025 and 2030, and implementation will take 1 to 3 years after the start date.

### Translation of All Emergency Preparedness Materials

This action is a Community and Outreach effort that involves disseminating those materials in native and local languages of communities. This outreach effort would increase local communities' access to emergency preparedness protocols such as evacuation plans so that residents are aware of evacuation, food assistance, and relocation procedures, and thus be able to follow and participate in those protocols.

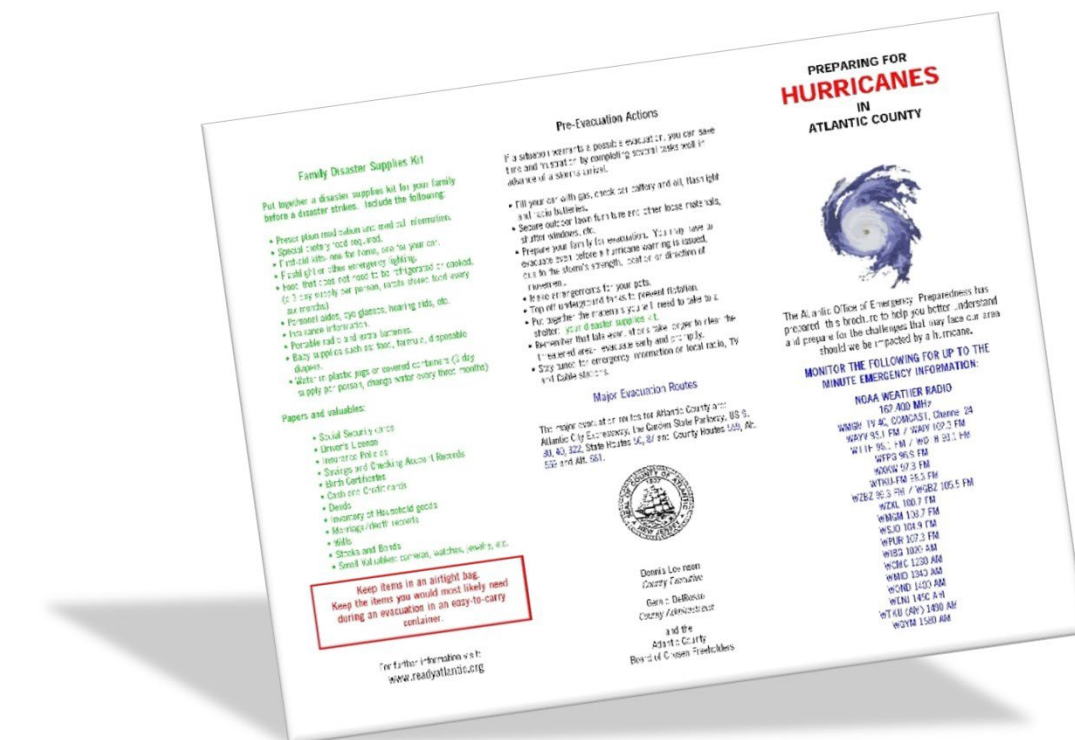


Image: Preparing for Hurricanes in Atlantic County<sup>12</sup>

<sup>12</sup> Available at <https://www.atlantic-county.org/>

### *Problem/Background Issues*

Education, training, and communication are essential elements of community resilience. Communication is also critical in each phase of the disaster management cycle (i.e., mitigation, preparedness, response, and recovery). In Atlantic County, the Office of Emergency Preparedness is responsible for coordinating responses to natural disasters and severe weather emergencies. The Office of Emergency Preparedness works with the emergency management coordinators in each of the ACCR's municipalities in their emergency response efforts. With more than eight languages spoken, Atlantic County is one of the most diverse communities in the state—translating disaster preparedness information would be an important step in bolstering the region's resilience and improving its ability to bounce back after major storm events.

### *Solution*

Translation of All Emergency Management Materials would address the need to synchronize local communities, in particular vulnerable populations, in their capacity to follow emergency protocols and aims to help avoid losses due to life and injury during large storm events. This action item has the potential to positively affect Atlantic City and Pleasantville, where SVPs are concentrated.

Translation efforts would go beyond literal word-for-word translation from English to other languages. The action would tailor written material to communicate the larger message for greater understanding by local communities. This approach would recognize cultural differences in interpretation of written material, for instance making use of colloquial and cultural-specific phrases, as well as visual materials and diagrams as best practices to outreach different communities. More specifically, demographic differences and special needs groups within non-native language communities should be identified so that emergency preparedness in terms of food supply could address dietary needs of specific age groups.

### *Flood Protection, Safety, and Risk Reduction*

This action would reduce risk to ACCR residents by improving the effectiveness of emergency preparedness efforts. It would also contribute to the effectiveness of post-disaster recovery efforts.

### *Connection to Resilience*

This action informs the social component of the resilience plan because it would improve emergency preparedness and the effectiveness of post-disaster recovery efforts.

### *Co-Benefits*

In addition to improving emergency preparedness and post-disaster recovery efforts, this action would help build organizational capacity in the region. This action would improve emergency preparedness and communication of evacuation procedures, along with the Evaluate and Improve Preparedness Action for SVPs action. This action item could positively affect Atlantic City, as well as Pleasantville, where SVPs are concentrated.

### *Potential Funding and Finance Opportunities*

Funding for this action item has not yet been identified; however, American Red Cross Prepare NJ is considered is one of the potential partners.



#### *Entity with Jurisdiction Over the Action*

Atlantic County in collaboration with the Emergency Management Planning – Preparedness coordinators of the ACCR’s seven municipalities would sponsor this action.

#### *Environmental Considerations*

This action item would not directly affect any specific environmental conditions.

#### *Local, State, Federal Regulatory Requirements*

Emergency Management Planning – Preparedness mechanisms would be used in implementation.

For this action to be implemented successfully, the emergency preparedness materials and the languages in the region need to be identified.

#### *Impact/Benefits to Socially Vulnerable Populations*

This action is geared toward LEP individuals, primarily located in Atlantic City, Pleasantville, and Ventnor, whose language barriers may prohibit them from obtaining preparedness materials and evacuation information. Translation of Emergency Prepared Materials into a more diverse set of languages would help the Emergency Management Planning – Preparedness coordinators of the ACCR’s seven municipalities to reach non-English-speaking residents, and as such, a greater percentage of the region’s SVPs.

#### *Indication of Public Support*

The ACCR Steering Committee recognizes the importance of this action for the region and has voiced its support.

#### *Project Cost Estimate*

The planning cost of this project is estimated at:

❖ \$ = Less than or equal to \$25,000

Availability of current funding needs to be determined. This action could potentially be funded by the American Red Cross and Prepare NJ funding programs.

#### *Implementation Timeline*

This short-term action is planned to start between 2025 and 2030, and implementation would take approximately 1-year following the start date.

## 5 PRIORITIZATION OF ACTIONS IN THE PREFERRED SCENARIO FOR IMPLEMENTATION

A key feature of the Resilient NJ prioritization approach is categorizing actions as Keystone Actions and Supporting Actions. Keystone Actions are identified as actions that are critical for the success of the scenario. Supporting Actions further build out (or support) the resilience strategies and strengthen the scenario. This approach serves as a prioritization framework for the implementation of the Preferred Scenario. Keystone Actions can be considered vital to the success of the Preferred Scenario with specific timelines associated with implementation. The Supporting Actions are each important to the Preferred Scenario, but their implementation timeline is more flexible—a significant increase in risk would not occur if their implementation were delayed.

**Table 5-1** provides a prioritization overview of the Preferred Scenario actions that would guide implementation.

In addition to the Keystone and Supporting Actions identified in **Table 5-1**, there are regional resilience actions, outside the jurisdiction of the municipalities, that are recommended to be further developed in the implementation phase. Recommendations include resilience improvements for the ACMUA water treatment plant in Pleasantville and the ACUA wastewater treatment plant in Atlantic City. The ACCR Steering Committee identified planning for continuity of operations at both facilities in the event of future storm surge events as important to the overall region. Additional partnership and stakeholder engagement meetings with ACUA and ACMUA are needed to identify resilience actions for implementation. In addition, the ACCR Steering Committee raised the importance of updating the current FEMA program for funding home elevation projects or creating a new loan program to front the cost to elevate homes or pay the local match for FEMA grants to make it affordable to homeowners who need the assistance. Being able to secure a loan or front the cost for home elevation projects continues to be a challenge within the ACCR and remains a barrier to achieving resilience.

*Table 5-1. Prioritization of Actions in the Preferred Scenario for Implementation*

Challenge Category	Action	Keystone or Supporting Action	Short- Mid- or Long-Term Action	Notes
Shoreline Protection	Living Bay Masterplan	Keystone Action	Short term	Implementation of this action needs to be prioritized because this item supports other actions addressing shoreline protection, as it brings benefits for flood protection along the bayside, a key vulnerability for ACCR.
Shoreline Protection	Absecon Baykeeper	Supporting Action	Short term	Directly supports the Living Bay Master Plan, which is a region-wide and Keystone Action.

Challenge Category	Action	Keystone or Supporting Action	Short- Mid- or Long-Term Action	Notes
Shoreline Protection	USACE New Jersey Back Bays Plan	Keystone Action	Long term	This action focuses specifically on bayside flooding; it connects the ocean-side protection to provide full perimeter protection on barrier islands for superstorms. This action needs to pair with New Pump Stations action for increased drainage for precipitation flooding.
Shoreline Protection	USACE Install Sheet Pile Dune Core	Supporting Action	Short term	A Supporting Action connected to other actions proposed for Shoreline Protection.
Shoreline Protection	Beach Nourishment Program	Keystone Action	Ongoing	This Keystone Action is crucial for ocean-side protection. This action can support all other Shoreline Protection Keystone Actions and Supporting Actions, yet this action also brings a nature-based solution so it can be implemented for its long-term impact and as a stand-alone action.
Shoreline Protection	Offshore Breakwaters Study	Supporting Action	Mid-term	A Supporting Action to the Beach Nourishment Program to enhance erosion/storm protection along the ocean-side and reduce the frequency of beach nourishment cycles.
Shoreline Protection	Bayshore Continuous Shoreline Protection Study	Keystone Action	Mid-term to long term	A Keystone Action that addresses bayside protection through a coupling partnership between municipalities and private developers. Its benefits for the community are extended with the inclusion of Absecon Bay Blue/Green Way action.
Shoreline Protection	Bulkheads for Bayside Protection North End	Supporting Action	Short term	A Supporting Action for shoreline protection overall; it complements the Bayside Bulkheading ordinance and existing bulkheads on the bayside.

<b>Challenge Category</b>	<b>Action</b>	<b>Keystone or Supporting Action</b>	<b>Short- Mid- or Long-Term Action</b>	<b>Notes</b>
Shoreline Protection	Absecon Bay Blue/Green Way	Supporting Action	Short term	A Supporting Action that addresses challenges related to Shoreline Protection. More specifically, the Blue Way can complement the Living Bay Masterplan and Absecon Baykeeper. The Green Way would be designed and implemented in conjunction with the Bayshore Continuous Shoreline Protection Study.
Power & Communication	Community Microgrid Systems Study	Keystone Action	Short term	A Keystone Action that needs to be prioritized to address power and communication challenges.
Power & Communication	Nanogrids - Encourage Solar Energy Panels on Rooftops & Surface Parking Lots	Supporting Action	Short term to mid-term	A Supporting Action that is directly connected to the Community Microgrid Systems Study.
Power & Communication	Install Emergency Generators at Key Critical Facilities	Supporting Action	Short term	This is a short-term Supporting Action until renewable energy based microgrids can be implemented as a Keystone Action.
Power & Communication	Harden Above-Grade Utility Poles & Bury Utilities to Create Fortified Grid	Supporting Action	Mid-term	A Supporting Action to address power and communication challenges; it can be implemented in coordination with other actions proposed for the same objective.
Access & Transportation	Elevated Roadways – Evacuation Routes and Key Connectors	Keystone Action	Mid-term	A Keystone Action connected to (existing and planned) pump stations that are explained in the New Pump Stations action.
Stormwater Management	New Pump Stations	Keystone Action	Short term	A Keystone Action connected to Elevated Roadways that complements the USACE New Jersey Back Bays Plan.
Stormwater Management	Living Streets Feasibility Study and Pilot Program	Supporting Action	Short term (pilot) – mid-term (larger-scale implementation)	A Supporting Action that addresses stormwater management with a nature-based and design-oriented solutions. Supports and works in conjunction with New Stormwater Management Parks and New Pump Stations actions.

<b>Challenge Category</b>	<b>Action</b>	<b>Keystone or Supporting Action</b>	<b>Short- Mid- or Long-Term Action</b>	<b>Notes</b>
Stormwater Management	Create New Stormwater Management Parks	Supporting Action	Short term (pilot)	Supports and works in conjunction with Living Streets Feasibility Study and Pilot Program if expanded.
Equitable Economic Development	Atlantic City Harbor Strategic Resilience Plan/Blue Economy Sites	Supporting Action	Short term to mid-term	Complements and supports the Bayshore Continuous Shoreline Protection Study.
Equitable Economic Development	Dredge Management Plan for Elevation of Development Sites	Supporting Action	Short term to mid-term	A companion to Atlantic City Harbor Strategic Resilience Plan/Blue Economy Sites action.
Vulnerable Populations & Public Facilities	Adaptation Action Plan for Atlantic City and Pleasantville Housing Authority Communities and the Region's Senior Centers	Supporting Action	Short term	A Supporting Action that supports all other actions concerning vulnerable populations.
Vulnerable Populations & Public Facilities	Evaluate and Improve Preparedness Actions for Socially Vulnerable Populations	Supporting Action	Short term	A Supporting Action that would be paired with Translation of all Emergency Preparedness Materials action.
Vulnerable Populations & Public Facilities	Translation of All Emergency Preparedness Materials	Supporting Action	Short term	A Supporting Action that would be paired with Evaluate and Improve Preparedness Actions for Socially Vulnerable Populations action.

## 5.1 Program Equity Framework

The Resilient NJ Program will deliver a program of projects to reduce anticipated flood impacts in 2070. While rainfall and SLR do not discriminate, the impacts on the community vary greatly based on the condition and quality of infrastructure, resources, and public information to support community resilience. To ensure the Program addresses the inequities of these impacts, the ACCR Action Plan recommends an equity framework to further inform prioritization of actions and project delivery to achieve comprehensive outcomes that avoid common pitfalls such as ideas designed as a defense to potential public opposition, ideas assumed to be inherently good for all, or ideas that conflate diversity and inclusion with equity. The framework will encourage and provide the will, education, and resources to make equity actionable.



## Framework

A program equity framework establishes a base standard of equity for planning and project delivery that can be used to guide tailored approaches for specific project types and neighborhoods in the program area. The proposed equity framework is a suite of suggested tools, resources, and partnerships. The framework itself is not a singular tool to apply—it is a blueprint to guide consistent equitable decision-making across the program’s projects. The framework will also support consistency in meeting this standard as agency staff and consultants may change over the program life cycle.

The proposed framework should include, but not be limited to, the following:

- ❖ Equity priorities by project category
- ❖ Standard Equity Operating Procedures (SEOPs)
- ❖ Equity-Informed Project Prioritization Tool
- ❖ Program Equity Council
- ❖ Program Equity Toolkit

## Equity Priorities by Challenge Category

The Preferred Scenario includes a suite of actions (projects) that meet the key challenges identified in the ACCR. The matrix in **Table 5-2** offers context for the equity considerations most relevant to each challenge category. The Equity Priorities in the table are *samples* of key equity considerations. These considerations can help guide future development of thoughtful project-specific equity goals and avoid reliance on one factor (e.g., workforce development) to check-the-box in achieving equity. Importantly, the more specific each project is about equity focus areas, the more likely the project is to achieve success in equity because specificity focuses attention, resources, and strategies of project teams. The matrix can and should expand, and equity considerations refined with new insight as the ACCR Action Plan progresses and early projects provide lessons learned, or community input surfaces additional considerations.

Table 5-2. Matrix for Equity Considerations

	Workforce Development	Land Acquisition & Zoning	Community Resilience	Sense of Belonging	Anti-displacement	Small Business Sustainability	Public Health	Public Investment
Project Categories ▼	Equity Priorities ▲							
Shoreline Protection	●	●				●		●
Stormwater Management	●	●	●				●	●
Access and Transportation			●			●		●
Power and Communications	●							●
Economic Development	●	●		●	●			●
Public Facilities		●		●	●	●	●	●
Natural Resources			●				●	●

## Descriptions

**Workforce Development:** Construction and maintenance may create work opportunities for the local environmental economy, but hiring locally in and of itself is not equity. Achieve equity by supporting training efforts for a pipeline of diverse candidates in collaboration with community partners and participating agencies, creating Program policy for Program contractors to demonstrate gender and race pay equity, or a similarly meaningful effort.

**Land Acquisition and Zoning:** Achieve equity by sourcing land through acquisition or rezoning based on the impact to the community, such as reduced opportunity to build affordable housing; reduced market value of homes; traffic that affects pedestrian and bike safety; increased distance to grocers, healthcare, and essentials; and other similarly meaningful considerations.

**Community Resilience:** Achieve equity by prioritizing the needs of households with limited resources to sustain through and overcome a natural disaster or emergency, including the uninsured, limited car accessibility, single parents, language or cultural differences, and other similarly meaningful factors.

**Sense of Belonging:** Achieve equity through placemaking that celebrates the culture of people of color, creates environments in which they are welcomed and safe, and ensures their experience as a local is not limited as a cost of accommodating tourism.

**Anti-Displacement:** Achieve equity by enhancing or supporting policy to protect current residents from displacement by new residents paying higher prices when Program projects improve the conditions, walkability, or the experience of a neighborhood. Anti-displacement policies can include rental assistance, foreclosure assistance, tenant right to counsel, and other similarly meaningful efforts.

**Small Business Sustainability:** Achieve equity by addressing the needs of small businesses, regardless of neighborhood or owner demographics, from planning through construction, and ultimately project outcomes, including parking, foot traffic, parklettes, and similarly meaningful efforts that retain or grow their customer bases.

**Public Health:** Achieve equity by improving environmental conditions disproportionately experienced by people of color and lower income households such as air pollution from lingering stormwater, previously flooded homes experiencing mold or other exposures, limited green space and its impact on mental health, and similarly meaningful conditions.

**Public Investment:** Achieve equity by assessing patterns of public investment in infrastructure and maintenance based on community geography and demographics to identify underinvested communities and determine proportional investments based on the risk level of the impacts these communities face.

## Standard Equity Operating Procedures

The SEOP is a training and onboarding tool for technical project staff that will be informed by key equity focus areas. It's intended to answer the question of *How?* For example, this document could address best equity practices and processes for different project team roles to organize and achieve the community benefits of the equity focus areas. A set of SEOPs will ensure all actions (projects) pursued from the Preferred Scenario meet the same level of effort to achieve equitable outcomes.

- ❖ Equity Lead for all Program project teams
- ❖ Racial Equity and Community Impact Assessment for each Program project
- ❖ Development of equity goals for each Program project
- ❖ Public engagement policy
- ❖ Neighborhood Change Assessment following select Program projects

### **Equity-Informed Project Prioritization Tool**

The ACCR Action Plan identifies a suite of Keystone Actions and a number of Supporting Actions to strengthen the scenario. The ACCR Action Plan documents the process to determine which projects are selected to be included in the Preferred Scenario, whether they qualify as a Keystone or Supporting Action, and their implementation timeframe. A supplemental step is to create a tool that will capture a process that identifies and weights various criteria points that reflect how a project protects and honors the people as well as the infrastructure and the environment. This project concept evaluation tool will be informed by key equity focus areas. The tool can be built on a methodology or logic to determine which projects should be prioritized based on how well the project benefits each of the key equity focus areas, to balance this social case with the business case of traditional evaluation like cost, operational and technical considerations.

### **Program Equity Council**

Moving forward, the ACCR Action Plan implementation phase can benefit from establishing a Program Equity Council, a representative advisory body that can guide implementation of SEOPs and support regional cohesion on policy and process to address priority community needs. This is a stakeholder partnership opportunity to capture and interpret qualitative input on the key equity focus areas, in addition to the processes the project teams practice to leverage this insight in their decision-making. This body can even add on to the key equity focus areas the program considers. The Equity Council can consist of agency staff, community-based organization leaders, and rotating seats for project equity leads.

### **Program Equity Toolkit**

An equity toolkit will serve as an education and onboarding tool that describes what equity is and its benefits in federal, state, and local contexts; a summary of regional history of demographics and economic, land use, and environmental impacts; a definition of Program priority communities and supporting maps; and the Program's approach to equity, including Equity Priorities by Challenge Category and SEOPs. This resource is designed to answer *Who?* and *What?* by offering a programmatic definition of equity communities, key equity focus areas, and relevant histories of the project area to align the project team on who our equity efforts should serve and how.

## **5.2 Conclusion**

Through the Resilient NJ Program, the ACCR is in the process of implementing specific near-term actions selected by the Steering Committee to enhance short-term resilience as well as set the region up for long-term success, making it attractive to future funding opportunities through federal government, state government, and non-governmental organizations. Utilizing the Resilient NJ prioritization approach as a roadmap for implementation, the ACCR is committed to furthering the actions identified in the Regional Resilience and Adaptation Action Plan to reduce the worst effects of increased precipitation, SLR, and coastal storms over the next 50 years and enable the region to thrive.